

FACING UNCERTAINTY: THE ROLE OF THE M1 ABRAMS
TANK IN THE U.S. ARMY OF 2015-2025

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Art of War Scholars

by

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ABSTRACT

FACING UNCERTAINTY: THE ROLE OF THE M1 ABRAMS TANK IN THE U.S. ARMY OF 2015-2025, by Major Michael B. Kim, 142 pages.

The future of the M1 Abrams tank is uncertain. With current fiscal constraints and the requirement for expeditionary maneuver, the U.S. Army is under pressure to demonstrate the need for its main battle tank. The purpose of this thesis is to inform the future role of the M1 Abrams tank by analyzing hybrid threat trends, understanding U.S. Army force structure challenges, and determining the relevancy of combined arms maneuver in the future operating environment. The thesis analyzes the Israeli Defense Force and its employment of the Merkava tank during Operation Cast Lead and Operation Protective Edge to develop insights and lessons learned. Drawing from these lessons, the thesis argues that the capabilities of the main battle tank are more critical and relevant in a hybrid environment than was seen in the past thirteen years of combat in Iraq and Afghanistan. The thesis concludes that the role of the M1 Abrams tank in the U.S. Army of 2015-2025 is to provide a mobile and survivable precision firepower platform to execute effective combined arms operations against a sophisticated hybrid threat with anti-tank guided missile capabilities in order to seize and hold terrain, mass discretionary fires, and destroy the enemy threat.

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ACRONYMS

ABCT	Army Brigade Combat Team
APC	Armored Personnel Carrier
APS	Active Protection System
ATGM	Anti-Tank Guided Missile
C2	Command and Control
CAM	Combined Arms Maneuver
DoD	Department of Defense
HIC	High-Intensity Conflict
IDF	Israeli Defense Force
IED	Improvised Explosive Device
ISR	Intelligence, Surveillance, and Reconnaissance
LIC	Low-Intensity Conflict
MANPADS	Man-Portable Air Defense System
OEF	Operation Enduring Freedom
OIF	Operation Iraqi Freedom
RPG	Rocket-Propelled Grenade
UAV	Unmanned Aerial Vehicle

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CHAPTER 1

INTRODUCTION

As the prospects for another head-on clash of large mechanized land armies seem less likely, the Army will be increasingly challenged to justify the number, size, and cost of its heavy formations.

— Secretary of Defense Robert M. Gates,
“Speech at the United States Military Academy”

The future of the M1 Abrams tank is uncertain. With current fiscal constraints and the requirement for expeditionary maneuver, the U.S. Army is under pressure to demonstrate the need for its Armored Brigade Combat Teams (ABCT), and specifically for its main battle tank, the M1 Abrams.¹ The questioning of the tank’s role in the U.S. Army of 2015-2025 stems from an underlying uncertainty regarding the future character of warfare. An extrapolation from the past thirteen years of operations in Iraq and Afghanistan could lead to the conclusion that future conflicts are likely to be unconventional and limited engagements; this supposition shifts the prioritization away from conventional platforms. The implications of this reading of recent history influence Army force structure, concepts, doctrine, and training, bringing into question the relevancy of combined arms warfare—and as a result, the role of the main battle tank.

As a key element of combined arms maneuver (CAM), the M1 Abrams tank must be evaluated within the analytic context of this concept. The purpose of this thesis is to utilize case studies in order to inform the role of the U.S. Army’s main battle tank by analyzing hybrid threat trends, understanding U.S. Army force structure challenges, and determining the relevancy of CAM in the future operating environment. This thesis uses the Israel Defense Force (IDF) experience during two recent combat operations—

Operation Cast Lead (2008) and Operation Protective Edge (2014)—to develop insights into the nature of the hybrid threat, conventional force structure, CAM, and the main battle tank. The IDF's main battle tank, the Merkava, is used as a comparable platform to the M1 Abrams tank due to similarities in capability and employment. In order to provide the proper analytic context for this thesis, the following section expands upon each contextual element and provides an overview and rationale for the utilization of the IDF and Merkava as case studies for the U.S. Army.

Hybrid Threat

Anticipated enemy capabilities frame the requirements for Army force structure, the application of CAM, and the role of the M1 Abrams tank. Although the exact nature of the future adversary is uncertain, recent and ongoing conflicts reveal trends that are likely to influence the conduct and character of future war. The 2012 *U.S. Army Capstone Concept* assessed Operation Iraqi Freedom (OIF), the Second Lebanon War (2006), and Operation Enduring Freedom (OEF) to determine the following enemy trends:

Trend #1: From 2003-2009, coalition forces confronted combinations of terrorist, insurgent, militia, and criminal organizations in Iraq. OIF/OEF demonstrated that U.S. forces must be prepared to face both conventional and irregular enemy forces that possess a wide array of capabilities.

Trend #2: Throughout OIF, enemy organizations adapted tactics and operations to changing conditions and what they perceived to be coalition strengths and weaknesses. Enemy forces attacked extended U.S. lines of communication, used technical countermeasures (global positioning system jammers) to degrade U.S. precision strike capabilities in urban terrain, and employed propaganda to erode international support for

the coalition. The U.S. Army must be prepared for an adaptive and innovative enemy that employs countermeasures, including dispersion and concealment in urban and complex terrain.

Trend #3: In the Second Lebanon War (2006), non-state actors employed conventional and unconventional tactics to counter a technologically superior army. Hezbollah leaders developed a wide range of capabilities to counter IDF strengths and exploit their weaknesses. Future enemy forces will evade detection from technologically superior intelligence, surveillance and reconnaissance (ISR) assets.

Trend #4: Similarly, during OEF, the enemy demonstrated the capability to elude detection, despite sophisticated ISR efforts. The U.S. Army in the future must retain the capability to maneuver and come into close contact with the enemy in order to destroy them.

Trend #5: OEF demonstrated that enemy forces can negate the effects of surveillance combined with long-range precision fires. ISR and precision technologies have improved the joint force's capabilities; however, these capabilities alone cannot deliver decisive victories against determined, adaptive enemies in complex environments. Enemy forces will use complex and urban terrain to avoid U.S. and allied surveillance capabilities, while emerging technologies will permit enemy forces to reduce equipment signatures.

Trend #6: Rapid development of disruptive technology has changed society and warfare alike. Technological trends indicate potential enemies will increase the range, accuracy, and lethality of their direct and indirect fire capabilities, presenting three significant threats to U.S. ground forces: ballistic penetration, network penetration, and

weapons of mass destruction. As these capabilities increase, the U.S. Army must reevaluate its systems and platforms to ensure they meet this threat.²

U.S. Army doctrine describes the future enemy threat as a hybrid threat. Headquarters, Department of the Army Training Circular 7-100, *Hybrid Threat*, defines the hybrid enemy as a “diverse and dynamic combination of regular forces, and/or criminal elements all unified to achieve mutually benefitting effects.”³ Hybrid threats can combine conventional military capabilities with tactics usually associated with insurgent activities. In order to approach enemy hybrid capabilities with more specificity and clarity, it is important to clearly define non-state irregular adversaries, hybrid adversaries, and state adversaries. The thesis adopts the following definitions from Dr. David E. Johnson’s monograph, “Hard Fighting: Israel in Lebanon and Gaza” (see figure 1).⁴

Non-State Irregular Adversaries are not well trained, have little formal discipline, and are organized in cellular structures or small formations (squads); employ small arms, Rocket-Propelled Grenades (RPGs), mortars, short-range rockets, and improvised explosive devices (IED)/mines; use cell phones and runners for decentralized Command and Control (C2).

Hybrid Adversaries (State-Sponsored) are moderately trained, disciplined, and organized into moderate sized formations (up to battalion); employ the same weapons as irregular adversaries, but with standoff capabilities such as Anti-Tank Guided Missiles (ATGMs), Man-Portable Air Defense Systems (MANPADS), and longer-range rockets; conduct semi-centralized Command and Control (C2) by multiple means.

State Adversaries are hierarchical organization consisting of brigade or larger sized formations; employ sophisticated air defenses, ballistic missiles, conventional

ground forces, special operations forces, air forces, navies, some have nuclear weapons; C2 is generally centralized.

From these definitions, two distinct characteristics define a hybrid threat. First, hybrid threats are state-sponsored (this differentiates them from non-state irregular forces) and second, hybrid threats possess standoff capabilities (ATGMs, MANPADS, and longer-range rockets).

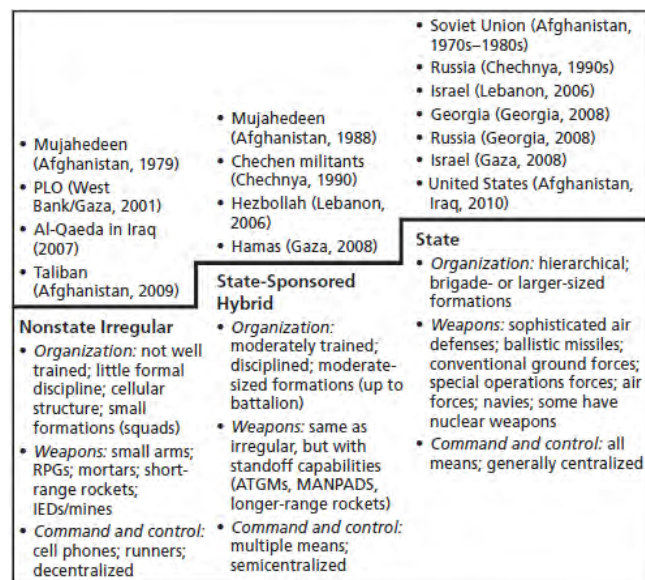


Figure 1. Levels of Adversaries

Source: David E. Johnson, “Hard Fighting: Israel in Lebanon and Gaza” (Monograph, RAND Arroyo Center, Santa Monica, CA, 2011), xxii.

Although the exact mix of future adversaries’ structures and capabilities is uncertain, this thesis follows current U.S. Army doctrine in assuming the future threat will combine conventional and nonconventional capabilities to exploit the vulnerabilities

of the U.S. Army. As the Army prepares to face future hybrid threat challenges, it must make hard decisions to develop the proper force structure to meet future demands.

U.S. Army Force Structure

Having assessed the trends associated with future hybrid threats, it is important to understand the challenges and decisions regarding U.S. Army force structure. Fiscal constraints have forced the Department of Defense (DoD) to review and modify the Army's force structure to meet budget initiatives. In order to meet future challenges, the U.S. Army advocates a leaner, more lethal, expeditionary, and agile force that is "uniquely enabled and organized to conduct expeditionary maneuver."⁵ General Raymond Odierno, in an address to the House Armed Services Committee on September 18, 2013, stated that the Army will "reprioritize [its] modernization programs and determine which ones are most critical to filling capability gaps and which ones will be delayed or cancelled."⁶ ABCTs have come under intense pressure to justify their role in the future force structure. Concurrently, the main battle tank of the U.S. Army is under scrutiny from numerous fronts questioning its relevance to the modern security environment.

The thesis adopts the naming convention of conservative and revisionist schools of thought from an IDF conference held by the Begin-Sadat Center for Strategic Studies, a leading Israeli think-tank, in 2013 (see table 1). Although the conference debated force structure changes within the IDF, the concepts are directly applicable to the U.S. Army. Based on an analysis of current academic and military literature, the thesis uses the IDF labels to characterize two broad perspectives regarding the development of U.S. Army force structure.⁷

Table 1. IDF Force Structure Schools of Thought

IDF Schools of Thought	Description
Conservative	War has not fundamentally changed; it is a human endeavor whose capabilities cannot be replaced by technology; Army must focus on conventional capabilities to destroy the enemy and seize/retain terrain
Revisionist	Future projections negate the likelihood of a HIC; Army must focus developing unconventional capabilities and limited engagements with an emphasis on special forces, stand-off precision fires, and emerging technologies

Source: Created by author.

The advent of unmanned aerial vehicles, cyber warfare, and other emerging technologies has led senior leaders and analysts once again to consider the construct of the Army's force. The conservative school argues that changes in warfare are incremental, and technological innovations do not fundamentally change the character of war.⁸ Proponents of this school argue that a reliance on low-intensity capabilities, and an over-reliance on air power, intelligence, special operations forces, and unmanned aerial systems, will weaken conventional capabilities that are necessary to face the future threat, and further, that becoming too dependent on technology ignores the central lessons of military history: war remains a fundamental clash of wills, and in ground combat, there is no substitute for the presence of soldiers. Professor Adrian Lewis, in his book *The American Culture of War: A History of US Military Force from World War II to Operation Enduring Freedom*, succinctly summarizes this lesson:

War is ultimately a human endeavor. It is more than killing. And the only thing that technology will ever do is make the act of killing more efficient . . . technology alone will never provide the answer to war. Technology alone will never stop a determined enemy. Man does not "make" the greatest weapon on the planet. Man "is" the greatest weapon in war.⁹

The revisionist school argues that future wars will be increasingly unconventional and limited. Advocates of this view see future projections negating the likelihood of a high intensity conflict (HIC) with a near peer competitor, and technological advances promoting the use of precision firepower from naval and aerial platforms. They argue further that the wars in Iraq and Afghanistan support the view that future warfare will be increasingly reliant on special operations capabilities supplemented by local allies and stand-off fire capabilities. Linda Robinson, a senior international policy analyst at RAND, states that budgetary pressures and the continued prevalence of irregular threats place a premium on cost-effective approaches to national security—one that can be filled by the special operations community who provide small-footprint operations and effective coordination with allies.¹⁰ In January 2014, the *Washington Post* reflected the view of anonymous military officials stating, “the manufacturing of tanks—powerful but cumbersome—is no longer essential. . . . In modern warfare, forces must deploy quickly and ‘project power over great distances’ . . . Weapons such as drones—nimble and tactical—are the future.”¹¹ In this interpretation, putting the country’s sons and daughters in harm’s way is unnecessary when technological advancements can provide capabilities that achieve desired end states without the loss of lives. Revisionists argue that the future force structure must be expeditionary and possess the technological capability to rapidly deploy scalable forces, tailored operationally and tactically significant. Antiquated platforms, such as the M1 Abrams tank, are not expeditionary in nature, possess significant limitations, and can be replaced by ISR assets and long-range precision fires.

The debates between the conservative and revisionist schools of thought are significant, as these perspectives will shape the construct of the U.S. Army force and the

concepts behind its employment. Assuming the hybrid threat is real, if the conservative school of thought is correct, then current Army CAM concepts are valid and applicable. Conversely, if the revisionist school of thought is correct, then combined arms warfare concepts are no longer relevant and new concepts must be developed. In order to assess the conceptual challenges facing the two schools of thought, it is important to examine the Army's current doctrine.

CAM

Having analyzed the nature of future threats and the debates surrounding future U.S. Army force structure, it is important to present a brief overview of the CAM concept's history in order to then examine the relevancy of CAM in today's operating environment. The concept of combined arms in ground combat has existed for centuries. Dr. Jonathan House, in his work "Toward Combined Arms Warfare: A Survey of 20th-Century Tactics, Doctrine, and Organization," describes the combined arms concept as the "basic idea that different combat arms and weapons systems must be used in concert to maximize the survival and combat effectiveness of the others."¹² Prior to World War I, the various combat arms (primarily infantry, artillery, and early concepts of the tank) existed independently of each other, with limited combined arms doctrine and coordinated training. The development of trench warfare and doctrine of defense-in-depth in World War I (by 1918, most armies imitated German doctrine) necessitated the need to develop more sophisticated and coordinated attacks, and the "seeds of future combined arms attacks" originated from this requirement.¹³

The interwar period saw the establishment and integration of mechanized forces, primarily the tank, into combined arms warfare doctrine. In Germany, Heinz Guderian

and other visionaries produced the panzer division, a mechanized force in which all the elements of combat arms were integrated. Prior to 1937, the lead in mechanized warfare belonged to the Soviets, who envisioned a “deep battle” fought by combined arms mechanized formations that could “rupture conventional enemy defenses and then simultaneously attack all echelons of that defense” with artillery, infantry, air strikes, and the maneuver of mechanized forces.¹⁴ This doctrine was significant in that it established the concept of maneuvering in operational depth to disrupt and destroy enemy capabilities at multiple echelons. The Red Army purge of 1937-1941, however, caused the Soviets to fall behind Germany in combined arms doctrine and capabilities.¹⁵

Germany’s initial victories in 1939-1941 defined blitzkrieg as the standard for mechanized combined arms. The German panzer division was a combined arms mechanized formation whose principal roles were exploitation, encirclement, and pursuit. Beginning in 1942, the Red Army rebuilt its tank and mechanized forces, retrained its leaders, and reestablished its Deep Battle doctrine to counter German combined arms tactics. The Soviets used deception operations and selective massing on narrow frontages to achieve overwhelming superiority at specific strong points. Combined arms assault groups reduced these strong points, while heavy tanks, medium tanks, infantry, artillery, and engineers cooperated to push rapidly through the main German defenses. Once this penetration developed, combined arms mechanized formations conducted rapid exploitation, maneuvering in operational depth to preempt German efforts to organize new defensive lines, disrupt supply and C2 nodes, and destroy the enemy reserve.¹⁶

The Soviet concept of Deep Battle remains the foundational concept of U.S. Army combined arms doctrine today. The U.S. Army maintains a force structure built

around combined arms platforms (M1 Abrams Tank, Brady Infantry Fighting Vehicle, helicopters, and artillery) with a doctrine focused on penetrating an enemy's defense, seizing and holding terrain, and exploiting in operational depth. The integration of these concepts can be traced throughout the evolution of Army doctrine, particularly AirLand Battle, and are clearly seen in Army Doctrine Publication 3-0, *Unified Land Operations*, which defines CAM as the “application of the elements of combat power in unified action to defeat enemy ground forces; to seize, occupy, and defend land areas; and to achieve physical, temporal and psychological advantages over the enemy to seize and exploit the initiative.”¹⁷

However, just as the atomic bomb in 1945 called into question the entire concept of combined arms warfare, the emergence of modern disruptive technologies have led senior leaders and analysts to once again consider the relevancy of CAM and increased scrutiny of the platforms designed to execute its concepts—foremost among them the M1 Abrams tank.

M1 Abrams Tank

Since its inception, the M1 Abrams tank has been the spearhead of Army ground forces, providing mobility, protection, and precision firepower capabilities on the battlefield. However, the unclear nature of the future threat, the challenges facing U.S. Army force structure, and the uncertain relevance of CAM have called the role of the M1 Abrams tank in the U.S. Army of 2015-2025 into question.

This thesis defines the three key attributes of the tank's capability—mobility, protection, and precision firepower—as follows:¹⁸

1. Mobility—the ability to rapidly maneuver cross-country with equal or greater speed than the adversary, providing commanders freedom of action.

2. Protection—the ability to shield Soldiers from danger through the physical protection of armament and psychological deterrence.

3. Precision Firepower—a weapon system controlled by a fire control system that allows for exact point-on-target application of rounds in a discretionary manner.

Uncertainty surrounding the role of a main battle tank is not a new phenomenon. There has been a cycle of acceptance and rejection throughout history based on emerging technologies and the most recent combat operation. In 1960, Liddell Hart, a British officer and military historian/theorist, observed, “time after time during the past forty years the highest [defense] authorities have announced that the tank is dead or dying.”¹⁹ Dr. John Stone, in his book *The Tank Debate* states that the uncertainty surrounding the role of the main battle tank has in fact been a defining feature of the Anglo-American attitude since World War I.²⁰ The modern main battle tank is a concept as much as a technology: the belief that combining mobility, protection, and precision firepower provides a uniquely powerful system on the battlefield.²¹ Even the U.S. Army’s own Armor Branch has questioned the future role of the main battle tank. In a 1972 issue of *Armor* magazine, LTC Warren Lennon wrote an article entitled “The Death of the Tank,” which claimed, “changes in tactics have led to the technological advances which have killed the concept of the tank as we know it.”²² The uncertainty regarding future employment of the main battle tank has been a near-constant debate throughout its history, and today’s environment is no different. As the U.S. Army draws down from the

wars in Iraq and Afghanistan, the debate surrounding the U.S. Army's main battle tank continues.

The M1 Abrams tank debate has entered discussions at the strategic and political levels—perhaps becoming the symbol of the tension between future Army capabilities and antiquated platforms. In January of 2014, the *Washington Post* published an article titled, “The End of the Tank? The Army Says it doesn’t Need it, but Industry Wants to Keep Building It,” which posits that military officials, having “given careful thought to their strategy . . . simply can’t afford to pay for more upgraded tanks.”²³ The article quotes General Raymond Odierno, the Army Chief of Staff, stating, “We don’t need [new] tanks . . . our tank fleet is 2 ½ years old average now. We’re in good shape, and these are additional tanks that we don’t need.”²⁴ The article reflects the pressures to make decisions not based on threat assessments, but rather the political landscape, and the struggle between Congress, which wanted to maintain tank plants, and the U.S. Army, which at that time assessed that upgrades to tanks were not needed. In a pertinent reminder that assessments change, however, the Army budget request just a year later in February 2015 included a 50 percent increase in funding for upgrades to the M1 Abrams tank,²⁵ reflecting increased concern regarding Russian actions in Ukraine and a resulting increase in the salience of the tank in the European context.²⁶ Given the contrasting decisions made by Army leaders over the past eighteen months, it is evident that the future of the M1 Abrams tank has yet to be resolved.

Problem Statement

Having reviewed the analytical context of the U.S. Army's main battle tank, this thesis establishes the following problem statement: The problem is the unclear role of the

M1 Abrams tank in the Army of 2015-2025, which stems from uncertainty regarding the future adversary, the optimal US Army force structure to face this threat, and the relevancy of CAM in the hybrid environment. In order to address this problem statement, the thesis uses two case studies involving the IDF to inform the future role of the M1 Abrams tank in the U.S. Army of 2015-2025.

IDF and the Merkava Main Battle Tank

IDF leaders are facing similar challenges as their U.S. counterparts assessing the future adversary, optimal force construct, CAM concepts, and the role of the main battle tank—the Merkava. The IDF provides a unique opportunity to analyze a conventional force addressing similar challenges as the U.S. Army (see table 2).

Table 2. U.S. and IDF Similarities

	U.S.	IDF
Hybrid Threat	Future adversary – unclear	Hezbollah (2006), Hamas (2008, 2014)
Force Structure Challenges	Fiscal constraints, two schools of thought	Fiscal constraints, two schools of thought
CAM	Interwar period after 13 years focused on LIC; no prioritization between LIC and HIC; relevance of CAM uncertain	LIC prior to 2006; shifted to high intensity CAM concepts for Operations Cast Lead and Protective Edge
Main Battle Tank	M1 Abrams Tank	Merkava Tank

Source: Created by author.

Unlike the United States, the IDF has experienced multiple iterations of ground combat against a hybrid threat to inform these decisions (see figure 2). From the Second Lebanon War to Operation Protective Edge in 2014, the IDF assessed its force structure, doctrine, and platforms in combat operations.



Figure 2. IDF Combat Operations, 2006-2014

Source: Created by author.

This thesis provides an overview of the Second Lebanon War, and examines Operation Cast Lead and Operation Protective Edge as case studies to inform the problem statement. Operation Pillar of Defense is not considered, because the IDF did not conduct ground operations.

2006 Lebanon War

In order to make the proper linkage between the problem statement and IDF operations, the context surrounding the 2006 Lebanon War must be addressed (a comprehensive review is conducted in chapter 3).

When war broke out in 2006, the disappointing performance of the IDF surprised both the public and the army itself. Senior IDF leaders believed, prior to the war, that a conventional engagement was highly improbable. After the U.S. invasion of Iraq, the fall of Saddam Hussein, and the collapse of the eastern front between Iraq and Syria, senior leaders believed the risk of full-scale wars was greatly reduced. Political and military leaders believed that “in the event such a danger should arise, the IDF would have plenty of time to deploy and train its troops.”²⁷ In 2003, the IDF adopted a multi-year fiscal plan involving significant budgetary cuts, closing entire units, including Merkava tank

brigades, and releasing 6,000 regular army personnel. By 2006, the IDF training budget was only half of what it had been in 2001, and the training budget for reserve training had been cut by 70 percent.²⁸ There seemed no real reason to provide serious training to the reserve forces, since preparation for fighting in the occupied territories required no more than a few days each time, and the budget for field training had been gradually reduced. In the IDF of 2006, battalion commanders—both regular and reserve—went into action without having ever commanded a battalion drill.²⁹

Perhaps most telling, the newly developed IDF operational concept reflected the belief that the character of conflict had changed—“the dangers of conventional war against regular armies was all but past.”³⁰ Prior to the 2006 Lebanon War, the IDF believed that the primary and immediate challenge was asymmetrical warfare. The new operational concept was intended to transform the definition of victory and the means of accomplishing IDF objectives. Amos Harel and Avi Issacharoff, in their seminal work *34 Days: Israel, Hezbollah, and the War in Lebanon*, provide an insightful description that summarizes the operational concept prior to the war:

Instead of the classical concept of military victory—conquest, capturing territory, and destroying the enemy’s forces—a new idea gained ground: victory would be achieved by applying a chain of “springboards” and “effects” on the rationale of the enemy’s systems. The IDF’s most advanced technologies—precision fire (especially from the air, but also from ground-based missiles), command and control systems, observation and intelligence gathering devices—would make the capture of territory obsolete. Large scale, in-depth troop maneuvering was seen as an outdated, even unnecessary combat technique. The long-term retention of territory was now perceived as an impediment, not an advantage. It was enough to employ return fire and limited ground raids, heavily supported by small, highly trained commando forces, in order to attain the desired results. . . . Technological superiority would ensure victory and save the lives of Israeli troops that would have been lost in close contact with the enemy.³¹

The 2006 Lebanon War was a disaster for the IDF. The Winograd Commission, the investigative body appointed by the state to conduct a thorough assessment of the war, used the word failure dozens of times in their findings. Major General (Res.) Giora Eiland, head of the National Security Council and Planning Branch of the IDF in the years preceding the war, stated that there was a “black hole” that was not taken into account before the war:

For four years we put the army at grave risk that, in retrospect, may have been unreasonable . . . we dismantled units, cut back training schedules and reduced the replenishment of ammunition. We thought that the regional and budgetary realities necessitated this and that we’d have enough time to take the necessary steps to fill in the gaps if the situation worsened. But Israel surprised itself with the decision to go to war.”³²

The challenges facing the IDF after the Second Lebanon War reflects the current debates of the U.S. Army today: the character of future warfare, the proper force structure to meet its demands, and the role of the M1 Abrams tank in the force structure. The Second Lebanon War displayed the poor performance of untrained Merkava units against a hybrid adversary; however, the war also sparked debate involving the role of the Merkava tank itself: did the war reflect its vulnerabilities, or reinforce its necessity? These questions would be debated and their resolution applied and executed during Operations Cast Lead and Protective Edge.³³

Operations Cast Lead and Protective Edge

The IDF integrated substantive changes based on the lessons learned from the Second Lebanon war. The IDF commenced Operation Cast Lead (2008) and Operation Protective Edge (2014) against Hamas, a hybrid threat, using a conventional force structure focused on CAM utilizing air, armor (primarily the Merkava main battle tank),

and infantry to meet its objectives. This thesis uses Operations Cast Lead and Protective Edge as case studies because they provide an opportunity to examine the adapting capabilities of a hybrid enemy threat, and are the most recent ground combat battles that reflect adaptations and innovations in conventional force structure, CAM concepts, and the role of a main battle tank.

Operation Cast Lead was a three-week armed conflict between Hamas and the IDF that began on December 27, 2008. This confrontation had been brewing since the Israeli withdrawal from Gaza in 2005. In the period following the Israeli pullout, tensions between Israel and Hamas steadily increased. Hamas protested Israel's decision to block traffic entering and exiting Gaza, and Israel complained about rocket and mortar attacks launched from Gaza at Israeli towns. In 2008, Hamas increased the number of rockets and mortars fired into Israel. Tensions and altercations increased, culminating in the execution of Operation Cast Lead by the IDF.³⁴

Operation Protective Edge was a fifty-day armed conflict initiated by the IDF on July 7, 2014, following increasing Hamas rocket fire from Gaza into Israel. IDF goals during the operation were to restore security to Israeli civilians living in range of Hamas rocket fire and to dismantle the Hamas tunnel network used to infiltrate Israel. Adapting lessons learned from Operation Cast Lead, Hamas displayed a wide range of combat capabilities, including new offensive and defensive tactics. Their evolution on the battlefield presented serious challenges to the IDF; Operation Protective Edge proved to be the most costly conflict, both in terms of casualties and damage, since Hamas seized control of the Gaza in 2007.³⁵ Operation Cast Lead and Operation Protective Edge

provide an excellent case study to analyze recent hybrid threat trends and the challenges presented in a hybrid environment.

IDF Merkava Main Battle Tank

Just as Operations Cast Lead and Protective Edge provide an excellent comparative case study, the Merkava tank itself serves as an analogous platform to the M1 Abrams tank (chapter 4 provides an in-depth comparison of the platforms). In the IDF, the Merkava is the primary symbol of the debate between conventional and nonconventional capabilities. Examining the debate surrounding the main battle tank provides a contextual understanding of the IDF's challenges regarding force structure and the prioritization of CAM. Like the U.S. Army, the IDF debates the merits of a main battle tank amidst significant budgetary pressures.

IDF experience from 2006 to the present provides several key lessons for the U.S. Army. From a focus on low-intensity conflict (LIC) prior to the Second Lebanon War to an understanding of the future hybrid threat after the conflict, the IDF has analyzed similar debates currently facing the U.S. Army. The lessons learned from these operations inform the debate regarding the future role of the main battle tank by identifying hybrid threat trends, discussing force structure decisions, and debating the relevancy of CAM.

Research Questions, Assumptions, Scope, and Limitations

Having established the proper analytic context in which to assess the problem statement, this thesis presents the following research questions:

Primary Research Question: What is the role of the M1 Abrams tank for the Army of 2015-2025?

Secondary Research Question #1: What characteristics of Hamas operations against the IDF during Operations Cast Lead and Protective Edge inform the U.S. Army's understanding of the future hybrid threat?

Secondary Research Question #2: What decisions made by the IDF after the Second Lebanon War and during Operations Cast Lead and Protective Edge inform current U.S. Army debates regarding force structure?

Secondary Research Question #3: What does the execution of combined arms warfare by the IDF during Operations Cast Lead and Protective Edge tell us about the relevancy and applicability of CAM in the hybrid environment?

Secondary Research Question #4: How does the utilization of the Merkava tank by the IDF during Operations Cast Lead and Protective Edge inform the role of a main battle tank in the hybrid environment?

In order to address these questions, the thesis makes two key assumptions: first, the thesis assumes that the anticipated enemy trends identified in the Army Capstone Concept and Army Operating Concept are credible. The thesis does not conduct independent research to develop enemy anticipated trends. Furthermore, the thesis assumes that the trends identified in Hamas operations can be extrapolated to represent possible trends of the future hybrid threat. Secondly, the thesis assumes that technological and material advancements from 2015-2025 will not fundamentally change the platforms and systems available to the U.S. Army. Within the given timeline, the thesis assumes that the M1 Abrams tank will not be replaced by a new generation of protected firepower

platforms. However, the thesis assumes that an upgrade cycle can be applied to the platform within the established time.

The thesis applies several boundaries to frame the research. First, the thesis looks at conflicts from 2008 to the present to extract anticipated enemy trends and lessons learned. While hybrid threats are not new (case studies from the French and Indian War to Vietnam attest to the existence of hybrid threats throughout history), post-2008 case studies involving the IDF most closely represent anticipated friendly and enemy capabilities described in current Army doctrine.³⁶

Secondly, the scope of this thesis focuses on the Army of 2015-2025. The established timeline allows for an analysis of the problem statement without huge shifts in technological or warfare variables. For this reason, future science and technological advances that can replace the M1 Abrams platform are not considered, including unmanned ground platforms. Third, the thesis focuses primarily on land power and limits the scope of research to this domain. Although the IDF executed extensive air operations during Operations Cast Lead and Protective Edge, the thesis does not conduct a thorough analysis of the air campaigns.

There are several limitations and delimitations for this thesis. First, open source information provides the foundation of research for this thesis. The majority of information contained in this thesis is strictly based on information available to the public. The thesis does include several notes based on discussions with senior civilian and military analysts with extensive knowledge of the IDF experience during recent operations (see endnotes for specifics regarding author's discussions with LTC Oren Giber—IDF Military Attaché Israeli Embassy; Dr. Dave Johnson—RAND; Dr. Jeffrey

White—Washington Institute for Near East Policy; and Mr. Richard Williams—Defense Intelligence Agency). Second, the recency of Operation Protective Edge in the Gaza (summer of 2014) limits the resources available, though limited analysis and after action reports from both U.S. and Israeli sources are accessible. Lastly, the thesis limits discussion of enemy capabilities to those that have been identified in past conflicts and excludes projected capabilities from analysis.

Conclusion

This thesis is significant for the U.S. Army because it identifies hybrid threat trends, discusses challenges facing force structure construct, debates the relevancy of CAM as the Army's warfare concept, and informs the role of the M1 Abrams tank in the U.S. Army of 2015-2025.

The following chapters are organized to analyze the role of the main battle tank in the proper analytic context established at the beginning of the chapter. Chapter 2 provides a literature review of the current debates arguing for and against the M1 Abrams tank in the U.S. Army force structure. Chapter 3 presents a detailed overview of the 2006 Lebanon War to provide context for the IDF's ensuing conflicts in the Gaza Strip. Chapter 4 describes the methodology by which the case studies are analyzed and presents hypotheses to inform the problem statement. Chapters 5 and 6 analyze Operation Cast Lead and Operation Protective Edge and provide an in-depth look at Hamas preparation and tactics, IDF force structure, execution of CAM, and the tactical role of the Merkava tank. At the end of each case study, the chapters provide an overall assessment of the operation and present lessons learned for the U.S. Army. The final chapter of the thesis

offers insights and recommendations for the U.S. Army and submits several areas for further research.

As the U.S. Army enters an interwar period following the wars in Iraq and Afghanistan, the decisions made today by senior leaders shape the future force that will meet the challenges of tomorrow's conflicts. This thesis informs these decisions by analyzing the future threat, debating the prioritization of force structure investments, assessing the relevancy of CAM, and informing the role of the M1 Abrams tank.

¹ Dr. David E. Johnson, Senior Analyst, Rand Institute, interview with author, RAND Corporation, Arlington, VA, February 2015. Discussions included the relevance of tanks in the future operating environment, hybrid threat trends, Israeli Defense Force, Merkava and regional alignment initiative. Dr. Johnson's work, "Hard Fighting: Israel in Lebanon and Gaza" (Monograph, RAND Arroyo Center, Santa Monica, CA, 2011), provided a base of knowledge from which to frame the thesis.

² U.S. Army Training and Doctrine Command, TRADOC Pamphlet 525-3-0, *The U.S. Army Capstone Concept* (Ft. Eustis, VA: U.S. Army Training and Doctrine Command, December 19, 2012), 11, 12, 14.

³ Headquarters, Department of the Army, Training Circular 7-100, *Hybrid Threat* (Washington, DC: Government Printing Office, November 2010), v.

⁴ Johnson, "Hard Fighting," xxii. Definitions are adapted from Dr. Johnson's publication.

⁵ MG Hix, Bill, "Strategic Landpower and Force 2025 and Beyond" (PowerPoint Presentation, Army Capabilities and Integration Center, U.S. Army Training and Doctrine Command, Ft. Eustis, VA, January 22, 2014), slide 4.

⁶ U.S. Congress, House, *Planning for Sequestration in Fiscal Year 2014 and Perspectives of the Military Services on the Strategic Choices and Management Review*, Statement by General Raymond T. Odierno, USA, before the House Armed Services Committee, 113th Cong., 1st sess., September 18, 2013, accessed October 27, 2014, http://armedservices.house.gov/index.cfm/hearings-display?ContentRecord_id=71D1123F-51F8-4141-B6E7-28D782B427FE.

⁷ LTC Mizrachi recommended the Begin-Sadat Institute to the author. The titles of the schools of thought: Conservative and Revisionist were taken from the lexicon used by IDF analysts after Operation Cast Lead during a conference sponsored by the Begin-

Sadat Center for Security Studies. The summary of the conference can be found at the following: BESA Staff, "Was it a Mistake to Downsize and Deemphasize Israel's Ground Forces?" (The Begin-Sadat Center for Strategic Studies, Israel, July 21, 2014), accessed February 19, 2015, <http://besacenter.org/uncategorized/mistake-downsize-deemphasize-israels-ground-forces>.

⁸ Ibid.,

⁹ Adrian R. Lewis, *The American Culture of War: A History of US Military Force from World War II to Operation Enduring Freedom* (Abingdon, UK: Routledge Publishing, February 2012), 378.

¹⁰ Linda Robinson, "The Future of US Special Operations Forces," Council Special Report No. 66, Council on Foreign Relations, New York City, NY, April 2013.

¹¹ Marjorie Censer, "The End of the Tank? The Army says it doesn't Need it, but Industry Wants to Keep Building It," *The Washington Post*, January 31, 2014, accessed October 23, 2014, http://www.washingtonpost.com/business/economy/the-end-of-the-tank-the-army-says-it-doesnt-need-it-but-industry-wants-to-keep-building-it/2014/01/31/c11e5ee0-60f0-11e3-94ad-004fe6a61ee6_story.html.

¹² Jonathan M. House, *Toward Combined Arms Warfare: A Survey of 20th-Century Tactics, Doctrine, and Organization* (Ft. Leavenworth, KS: Combat Studies Institute, August 1984), 1.

¹³ Ibid., 182.

¹⁴ Ibid.

¹⁵ Ibid., 183, 184.

¹⁶ Ibid., 184-186.

¹⁷ Headquarters, Department of the Army, Army Doctrine Publication 3-0, *Unified Land Operations* (Washington, DC: Government Printing Office, October 2011), 6.

¹⁸ COL David B. Haight, COL Paul Laughlin, and CPT Kyle Bergner, "Armored Forces: Mobility, Protection and Precision Firepower Essential for Future," *Armor* (November-December 2012): 5.

¹⁹ John Stone, *The Tank Debate* (Amsterdam, Netherlands: Hardwood Academic Publishers, 2000), 1.

²⁰ Ibid., 2.

²¹ Michael Peck, “Why the Death of the Tank is Greatly Exaggerated,” *War is Boring Online*, October 23, 2013, accessed April 25, 2015, <https://medium.com/war-is-boring/why-the-death-of-the-tank-is-greatly-exaggerated-751f5ccd091>.

²² LTC Warren Lennon, “The Death of the Tank,” *Armor* (January-February 1972): 5.

²³ Censer, 1.

²⁴ *Ibid.*

²⁵ Michael Hoffman, “Army Asks for More Money to Upgrade Abrams Tank,” *DoD Buzz: Online Defense and Acquisition Journal* (February 9, 2015), accessed March 14, 2014, <http://www.dodbuzz.com/2015/02/09/army-asks-for-more-money-to-upgrade-abrams-tanks/>.

²⁶ *Ibid.*

²⁷ Amos Harel and Avi Issacharoff, *34 Days: Israel, Hezbollah, and the War in Lebanon* (New York: Palgrave Macmillan, 2008), 43.

²⁸ Lazar Berman, “The Lessons of the Second Lebanon War,” American Enterprise Institute Online, August 12, 2011, accessed February 20, 2015, <https://www.aei.org/publication/the-lessons-of-the-second-lebanon-war>.

²⁹ Harel and Issacharoff, 43.

³⁰ *Ibid.*, 60.

³¹ *Ibid.*

³² *Ibid.*, 73.

³³ *Ibid.*, 60, 246.

³⁴ Johnson, “Hard Fighting,” 96.

³⁵ Israeli Defense Forces, “Special Report: Operation Gaza 2014,” *Israeli Defense Forces Blog*, January 26, 2015, accessed February 15, 2015, <http://www.idfblog.com/operationgaza2014/>; Jeffrey White, “The Combat Performance of Hamas in the Gaza War of 2014,” *CTC Sentinel* 7, no. 9 (September 2014): 1.

³⁶ Headquarters, Department of the Army, Training Circular 7-100, 1-1.

CHAPTER 2

LITERATURE REVIEW: M1 ABRAMS TANK

This chapter analyzes the diverging views surrounding the M1 Abrams tank. The literature review provides supporting arguments for the M1 Abrams tank in the future Army force structure as well as opposing arguments, centering on the argument that future warfare will not require a robust conventional land force.

Arguments for the M1 Abrams Tank

Proponents of the M1 Abrams tank point to the 2006 Lebanon War and the wars in Iraq and Afghanistan to argue for the relevance of the Abrams platform. There are two prominent works that advocate for the role of tanks in the U.S. Army: Dr. David E. Johnson's monograph titled "Heavy Armor in the Future Security Environment" and Lieutenant General H. R. McMaster's article in *Foreign Affairs* with Chris McKinney and Mark Elfendahl titled, "Why the US Army Needs Armor: the Case for a Balanced Force."

Dr. David E. Johnson (a Senior Political Analyst at the RAND corporation), in his work "Heavy Armor in the Future Security Environment," identifies the "utility of heavy armored forces against the full range of potential enemies that the United States could face in the future: non-state irregular, state-sponsored hybrid, and state adversaries."¹ Johnson states that although recent perceptions and pressures have made the Army's force structure, particularly the ABCT, a target for cost-cutters, recent history, and trends in conflict indicate that the ABCTs are a crucial U.S. hedge against what is likely to be a very complex and lethal future operating environment. He states that it is more

reasonable to assume that future enemy threats will present challenges for which the U.S. Army is not prepared. Future adversaries will be adaptive and will strive to present U.S. challenges that reduce its overmatch advantages and confound U.S. capabilities.²

Johnson provides three reasons for why he believes heavy armor is critical to the U.S. Army. First, he argues that heavy units are key enablers for forces facing irregular adversaries. He uses the U.S. Army's experience in Afghanistan and Iraq, where forces faced the threat of IEDs and rocket-propelled grenades, to argue that heavy armor operated with much higher levels of survivability than medium armored platforms, such as the Stryker platform. Second, Johnson states that heavy forces are needed when hybrid adversaries have standoff weapons. He uses two recent cases of hybrid warfare, the 2006 Second Lebanon War and Operation Cast Lead in Gaza, to argue that heavy armored formations were the "only units able to maneuver on a battlefield where an adversary had an effective standoff weapons capability, particularly ATGMs and MANPADS."³ He contends that hybrid adversaries use standoff weapons to expand engagement areas farther than irregular enemy forces. This makes it difficult for friendly forces to close with and destroy the enemy. The availability of precision guidance capabilities for indirect fire weapons (e.g., rockets and mortars) exacerbates this challenge. Johnson states that in order to defeat such enemies, friendly forces must "use combined arms ground fire and maneuver to close with the adversaries and force them to either fight or move, thus exposing them to attack by direct and indirect fires."⁴ Lastly, Johnson states that heavy armor is necessary because state adversaries also possess them. He argues that state adversaries can create operational environments "in which only heavy forces can operate with acceptable risks."⁵

The underlying concern of Johnson's article is the question of how to minimize risk in shaping the future Army force structure. Johnson argues that, while optimizing for irregular warfare would lead to a greater emphasis on light infantry formations that have protection against short-range weapons and IEDs, such a force would be ill prepared for a hybrid or state adversary with standoff weapons. Johnson concludes his monograph discussing scalability. He argues that light forces optimized for irregular warfare cannot scale up to the high-lethality standoff threats that hybrid adversaries present.⁶ As the IDF learned in 2006, a more prudent approach is to base the majority of a force's structure on heavy forces "that can scale down to confront irregular adversaries as part of a balanced force that includes light infantry."⁷

In "Why the US Army Needs Armor: the Case for a Balanced Force," Lieutenant General H. R. McMaster, Chris McKinney, and Mark Elfendahl argue that armored forces are an essential part of a capable military, and that their capabilities will prove necessary for fighting the wide range of military operations in the future. The authors note that some critics have begun to question the value of armored forces. Opponents argue that the U.S. rebalance to Asia relies more on naval and air forces, and that the use of North Atlantic Treaty Organization airpower in Libya foretells a future way of war that has little need for ground forces, particularly armored ones. They provide three reasons why the U.S. Army needs heavy armored forces: first, they are needed for state on state contingencies. Heavy armor is well suited to seizing terrain and exercising control over populations and resources, and is critical both to deterring aggression and winning conflicts when deterrence fails. The article uses the 1990-1991 Gulf War and the U.S. invasion of Iraq in 2003 as evidence for this argument. When the Third Infantry Division

crossed the Euphrates River, it encountered an unsuspected enemy armored brigade counterattack. It was the division's armored forces that possessed enough protection to bear the brunt of the counterattack, mobility to maneuver to advantageous positions, and enough firepower to overwhelm the enemy while taking very few casualties. The authors argue that the United States is not the only country that recognizes the importance of heavy armored forces, which is a primary reason why it needs to retain enough of its own. When Russia invaded Georgia in 2008, its armored units facilitated a defeat of the Georgian brigades within just a few days.⁸

Second, McMaster, McKinney, and Elfendahl argue that armored forces are needed in countering insurgents. The article states that the wars in Afghanistan and Iraq demonstrated the importance of heavy armor in fights against non-state organizations. In these wars, the U.S. Army used tanks and armored units to great effect. Further, they counter another argument against tanks by arguing that although it may seem counterintuitive, the "firepower provided by Abrams tanks and Bradley Fighting Vehicles is highly discriminate."⁹

Lastly, the authors echo Johnson in claiming that unlike any other type of force, ABCTs have the versatility to scale down for lower-level adversaries or scale up against more lethal enemies. The article uses the fight for Sadr City in 2008 as a primary example. During the fight for Sadr City, "units that had been patrolling Baghdad in lightly armored wheeled vehicles quickly replaced them with tracked Abrams tanks and Bradley Fighting Vehicles as the violence escalated, and then returned to their wheeled vehicles after the battle."¹⁰ The article concludes by stating that as military technologies continue to spread, future enemy forces will employ advanced weapon systems to deny

U.S. forces the ability to operate in protected areas. To address this challenge, the U.S. Army needs armored forces “to fight their way through long-range weapons fire and gain physical contact with hard-to-find opponents.”¹¹

Proponents of M1 Abrams tank argue that the uncertain character of future conflicts necessitates the need for a mobile and survivable platform to decrease risk and defeat future adversaries. The flexibility of tank units to execute operations in conventional and unconventional environments, as well as their ability to scale down and transition across the range of low and high intensity conflicts, makes the tank a requisite capability for the future Army force structure. Opponents state that this view is fundamentally flawed in that the emerging threat is not as great as perceived, and the emergence of technology can replace the capabilities of the M1 Abrams tank without committing ground forces in harm’s way; in an environment influenced by fiscal restraints, drastic reforms are prudent and necessary.

Arguments against the M1 Abrams Tank

Analysts and military professionals provide both strategic- and tactical-level arguments against the M1 Abrams tank. At the strategic level, two prominent works recommend the significant downsizing of Army ground forces: Admiral (Retired) Gary Roughead and Kori Schake’s monograph “The Hamilton Project: National Defense in a Time of Change,” and Lieutenant General (Retired) David W. Barno, Nora Bensahel, Matthew Irvine and Travis Sharp’s monograph “Sustainable Pre-eminence: Reforming the US Military at a Time of Strategic Change.” In both reports, the authors argue that debt reduction is a crucial national security issue and failure to achieve it soon will drastically constrain America’s militarily. This supposition informs their

recommendation for drastic reforms, including specifically reductions to the armored force. At the tactical level, the primary argument revolves around the Afghan model—reliance on stand-off power and allies on the ground. Erica Borghard and Constantino Pischedda’s work titled “Allies and Airpower in Libya” is a significant monograph that argues for the application of the Afghan model in future operations.

In their monograph, Roughead and Schake question the Army’s perception of the future operating environment and recommend reforms that can align future budgets with military needs. The authors state that there exists a misinformed “perception that the current environment is more hostile to America interests than previous areas,”¹² when in fact, although the current environment is challenging and complex, the United States is well positioned to successfully cope with complexity, and the challenges the U.S. Army faces are much less formidable than those that have confronted our nation at numerous points in history. Roughead and Schake state that there is not a pressing, systemic, or overwhelming challenge to our country; the threats the U.S. Army face are complex and disruptive but not existential. Given this perspective on the future environment, they state that the DoD’s unwillingness to develop a feasible plan to reduce defense spending puts defense capabilities at risk. Roughead and Schake argue that the DoD should focus on three areas of reform: (1) A military force better designed to face modern security challenges; (2). A more effective and more efficient acquisition system with a more diverse defense industrial base; and (3) A more cost-effective pay and benefits structure that better satisfies the preferences of servicemen and servicewomen.¹³

Roughead and Schake state that the Pentagon’s 2012 strategy is somewhat at odds with the force it buys—“one that is too heavily invested in a large ground force that does

not provide for adequate speed of response to conflicts in Asia, shifts too little risk to allies, relies too much on growing civilian force, and spends too little to redress crucial vulnerabilities in our forces.”¹⁴ The authors believe that the current strategy is right to consider fighting manpower-intensive, sustained ground combat or counterinsurgency operations unlikely and choose to accept risk in this element of force design because it is unlikely that political leaders will chose this course of action for at least a decade. Given their assessment, Roughead and Schake recommend rebalancing the force to concentrate less on the fighting of sustained ground wars and more on providing for rapid responses in Asia, and to transfer much greater responsibility to U.S. allies. They argue that the U.S. force structure that meets this end state would maintain the Navy and Air Force at current levels, reduce the active duty Army to 290,000 soldiers, and increase Reservists and National Guardsmen by 100,000 soldiers.¹⁵

In “Sustainable Pre-eminence: Reforming the US Military at a Time of Strategic Change,” Lieutenant General (Retired) David W. Barno, Nora Bensahel, Matthew Irvine and Travis Sharp provide more detailed recommendations for reducing the active duty U.S. Army. The authors argue, “too many DoD structures, processes, programs and operational concepts are legacies of the past, which create unnecessary redundancies, waste valuable resources and encourage unproductive competition among the services rather than cooperation.”¹⁶ Furthermore, they disagree with those who argue that preserving American military pre-eminence requires maintaining or increasing current levels of defense spending. The authors make four recommendations based on their analysis: (1) DoD should prioritize naval and air forces to project power and deter aggression in the Pacific and greater Middle East; (2) DoD should increase

interdependence across and within the military services; (3) DoD should match requirements to likely threats based on holistic analysis of the capability of the joint force; and (4) DoD should accelerate investments in technologies that leap ahead of the planned next generation of existing systems.¹⁷

Based on these recommendations they make numerous suggestions for reform. For this thesis, two will be reviewed. First, the authors suggest that the Pentagon should shrink the number of geographic combatant commands from six to four by merging U.S. Africa Command with U.S. European Command and U.S. Northern Command with U.S. Southern Command. Furthermore, the military services should replace administrative service component commands with components that also have war-fighting capabilities. Secondly, the authors suggest that in order to accommodate budget cuts and the end of two major ground wars, the Army should reduce the active duty force to 480,000 and transfer up to one-quarter of its active component armor brigades to the reserve component. They argue that the invasion of Iraq only required three U.S. Army armored or mechanized brigades alongside their U.S. Marine and British counterparts. The authors state that moving four of the seventeen armored brigade combat teams to the Army National Guard will save considerable resources. In 2013, Major General Wesley Craig, the Adjutant General of Pennsylvania, estimated that the National Guard can man and train brigade combat teams for 25 to 30 percent of the cost of an active duty brigade combat team, saving \$683 million dollars annually.¹⁸

In “Allies and Airpower in Libya,” Dr. Borghard and Dr. Pischedda state that the 2011 North Atlantic Treaty Organization intervention in Libya was a success in several important respects: it helped topple Muammar Qaddafi’s regime without the deployment

of ground forces, and with very low levels of collateral damage and no casualties. The successful overthrow of the Taliban in 2001, following a strategy of combining precision air strikes with local allies fighting on the ground, led a number of observers and analysts to herald the coming of a new way of war, known as the Afghan model. Proponents of this model use the experience in Libya, as a primary example to show that the deployment of U.S. ground forces is unnecessary. In Libya, the attrition achieved by precision airpower enabled the toppling of the regime on the ground. The protracted nature of the intervention provided sufficient time for rebels to become better trained and armed, and to improve their coordination with the North Atlantic Treaty Organization. The authors argue that policymakers must understand the “generalizability of the circumstances that led to success in Libya.”¹⁹

In the midst of budgetary constraints, senior military leaders must balance traditional Army capabilities and platforms with emerging technologies. Opponents of the M1 Abrams tank argue that the changing character of warfare and the increasing capabilities of UAV, air, and intelligence platforms justify the reduction of expensive platform such as the main battle tank.

Conclusion

The debate surrounding the role of the M1 Abrams tank is pressing and relevant. The main battle tank represents two diverging views on the character of future warfare. Proponents argue that the M1 Abrams tank is a critical component of the future Army’s ability to meet future threats across the range of military operations. Opponents argue that the tank force structure and modernization efforts are simply unaffordable, and heavy platforms are prime candidates for reduction. These arguments directly shape the U.S.

Army's force structure as they influence the allocation of funds and resources. In order to better inform these decisions, this thesis analyzes the IDF experience from 2006 to 2014. The following chapter provides an in-depth analysis of the conduct and consequences of the Second Lebanon War. The IDF experience during this war sparked debates regarding the direction and prioritization of IDF force structure and allocation of limited funds. An analysis of the Second Lebanon War provides insights into these discussions and provides the context in which the ensuing conflicts, Operations Cast Lead and Protective Edge, were executed.

¹ Johnson, interview with author. Discussion expanded upon the characteristics of the hybrid threat (exhibited by Hezbollah during the Second Lebanon War and Hamas during Operation Cast Lead) and the importance of heavy platforms. Dr. Johnson contributed to the author's understanding of lessons learned from these operations.

² David E. Johnson, "Heavy Armor in the Future Security Environment" (Monograph, RAND Arroyo Center, Santa Monica, CA, 2011), 1-2.

³ Ibid., 2,4.

⁴ Ibid., 2-5.

⁵ Ibid.

⁶ Ibid., 6.

⁷ Ibid., 5-6.

⁸ Chris McKinney, Mark Elfendahl, and LTG H. R. McMaster, "Why the US Army Needs Armor: The Case for a Balanced Force," *Foreign Affairs* (May-June 2013): 130-132.

⁹ Ibid., 132.

¹⁰ Ibid., 133.

¹¹ Ibid.

¹² Admiral (Ret.) Gary Roughead and Kori Schake, “The Hamilton Project: National Defense in a Time of Change” (Discussion Paper, Brookings Institution, Washington, DC, February 2013), 5, 8-10.

¹³ Ibid., 5, 8-10.

¹⁴ Ibid., 12.

¹⁵ Ibid., 12-13.

¹⁶ LTG (Ret) David W. Barno, Nora Bensahel, Matthew Irvine, and Travis Sharp, *Sustainable Pre-eminence: Reforming the US Military at a Time of Strategic Change* (Washington, DC: Center for a New American Security, May 2009), 5.

¹⁷ Ibid.

¹⁸ Ibid., 6-7, 30; MG Wesley E. Craig, “The Army National Guard: The Cost Effective Solution,” The National Guard Association of the United States, September 3, 2013, accessed April 29, 2015, <http://www.ngaus.org/sites/default/files/ARNG%20Cost%20Effectiveness%20MG%20Craig.pdf>.

¹⁹ Erica D. Borghard and Constantino Pischedda, “Allies and Airpower in Libya,” *Parameters* (Spring 2012): 70.

CHAPTER 3

LITERATURE REVIEW: SECOND LEBANON WAR

The Second Lebanon War has become a textbook case of the kind of hybrid warfare that many defense analysts believe the United States will encounter in future conflicts.¹ As the IDF initiated changes in doctrine, force structure, and material based on the lessons learned from this conflict, a review of the Second Lebanon War is critical to the proper understanding of IDF actions in the Gaza in 2008 and 2014.

Four major monographs analyze the Second Lebanon War: “Hard Fighting: Israel in Lebanon and Gaza” by Dr. Dave E. Johnson, “We Were Caught Unprepared: The 2006 Hezbollah-Israeli War” by Dr. Matt Matthews, “Back to Basics: A Study of the Second Lebanon War” by the Combat Studies Institute (edited by Lieutenant Colonel Scott Farquhar), and “The 2006 Lebanon Campaign and the Future of Warfare: Implications for Army and Defense Policy” by Dr. Stephen Biddle and Dr. Jeffrey A. Friedman. The findings of the Winograd Commission (the Israeli investigation into the Second Lebanon War) significantly informed each of these works.

In “Hard Fighting: Israel in Lebanon and Gaza,” Dr. Johnson warns that the U.S. Army’s “almost exclusive (and understandable) focus on irregular warfare... might be approaching a situation similar to that of the Israeli’s in the Second Lebanon War, when the IDF found itself in an unexpected hybrid war.”² Johnson identifies three events prior to the 2006 war that influenced the IDF’s expectations about future warfare. First, the war in Kosovo (1999) and initial U.S. operations in Afghanistan and Iraq revealed the implications of the advancements of ISR capabilities and precision strikes. These implications created a belief among some IDF leaders that standoff attacks (primarily by

air power) were an effective means of affecting the enemy's will, lowering IDF casualties, lessening collateral damage, and increasing cost savings. Second, the beginning of the second al-Aqsa Intifada forced the IDF to focus on operations designed to stop terrorist attacks inside Israel, which created a mindset focused on low-intensity conflict. Lastly, the ongoing U.S. presence in Iraq, coupled with the low level threat to Israel from neighboring territories (except Syria), led the Israelis to believe that the era of major war had passed and that the role of ground forces were now primarily in low-intensity engagements.³

Johnson states that these views shaped the mindsets of Israeli political and military leaders. As a result, "defense spending was cut, armored-unit training [deemed largely irrelevant in low-intensity conflict] was neglected, the IDF staffs and processes responsible for integrating air and ground operations were removed from brigades, and there was little training in air-ground integration."⁴ The IDF's near exclusive focus on LIC resulted in a force that was incapable of executing integrated air-ground operations associated with major combat. The IDF initially expected to achieve its objectives largely through air and artillery strikes and limited ground raids. Israel's political and military leaders opposed the deployment of a large ground force (though such a deployment was later ordered, after stand-off fires did not achieve desired objectives). Conditioned for LIC, IDF ground forces encountered significant difficulties in the fight against Hezbollah (a hybrid threat) and suffered many casualties. In the aftermath of the Second Lebanon War, the IDF went back to basics, drawing up a new defense plan that emphasized building up ground forces and training them extensively in high-intensity conflict skills, particularly combined arms fire and maneuver tactics. After the war, the IDF devoted 80

percent of its training to high-intensity training and began adding new heavy infantry armored fighting vehicles and additional Merkava IVs.⁵

In “We Were Caught Unprepared: the 2006 Hezbollah-Israeli War” and Chapter 1 of “Back to Basics: a Study of the Second Lebanon War and Operation Cast Lead,” historian Dr. Matt Matthews provides an extensive analysis of Hezbollah and its preparations prior to the Second Lebanon War, as well as insight into the evolving operational concepts and doctrine of the IDF. In 2000, Hezbollah managed to drive Israel out of southern Lebanon. During the subsequent years, Hezbollah set about “transforming itself from a purely guerrilla army into what its Secretary-General, Hasan Nasrallah, called a ‘new model’ army—it was not a regular army but was not a guerrilla in the traditional sense either . . . it was something in between.”⁶

Prior to the 2006 war, Hezbollah forecasted that in a future war, the IDF would rely heavily on air and artillery precision weapons and limit its use of ground forces. Based on Hezbollah’s experiences in its first long war with Israel, it was confident that Israel would not have the will to absorb casualties and would conduct future operations using standoff firepower. Hezbollah’s strategy was to penetrate into Israel’s border and protect itself from IDF’s precision standoff weapon systems. To accomplish this task, Hezbollah formed rocket artillery units and emplaced missile launchers inside villages and the surrounding orchards and fields of southern Lebanon. Hezbollah’s goal was to undermine Israel’s strategy to destroy its rocket capabilities with air strikes. Tactically, Hezbollah established a simple yet effective system for firing Katyusha rockets in the face of Israeli weapon systems:

Once lookouts declared the area free of Israeli aircraft or UAVs, a small group moved to the launch site, set up the launcher and quickly departed. A second group would then transport the rocket to the launch location and promptly disperse. A third small squad would then arrive at the launch position and prepare the rocket for firing. The entire process was to take less than 28 seconds. The vast majority of the rocket systems were cached in underground shelters and bunkers built to withstand precision air and artillery strikes.⁷

By 2006, Iran and Syria had supplied Hezbollah with nearly 12,000 to 13,000 short, medium, and long-range surface-to-surface rockets. To protect the rockets, Hezbollah fighters were armed and reinforced with hundreds of antitank missiles. Hezbollah was prepared to conduct elaborate antitank ambushes, and trained extensively to integrate mortars and rockets into their attacks.⁸ At the tactical level, Hezbollah addressed the IDF's precision fires capabilities by reducing its own weapons signature and building hardened defensive positions. By 2006, Hezbollah had constructed a well-trained, well-armed, focused fighting organization.⁹

By the Second Lebanon War, the IDF's operational concept focused on air power and effects-based operations. Effects-based operations proponents within the IDF came to believe that an enemy could be completely immobilized by precision air attacks against critical military systems. Effects-based operations supporters believed that few or no land forces would be required to destroy the enemy in future operations. Matthews states that surprisingly, there were IDF officers who did not believe that they would ever confront adversaries applying conventional methods again, and as a result did not prepare to do so. Along with the effects-based operations operational concept, the IDF also had a new doctrine based on the theory of systemic operational design. Matthews states that the new design was intended to help IDF commanders plan their campaigns and contained terminology drawn from post-modern French philosophy, literary theory, architecture,

and psychology. In reality, the new language and methodology confused many IDF officers. Furthermore, budgetary cuts to the ground forces and the demands placed on them by Palestinian attacks stretched the IDF to its limits.

At the conclusion of the war, Hezbollah had launched 3,790 rockets in Israeli territory, killing forty-two civilians and wounding 4,262. Of the 114 IDF personnel killed, thirty were tank crewmen; out of the 400 tanks involved in the fighting, forty-eight were hit, forty were damaged, and twenty penetrated. Matthews states that effects-based operations and systemic operational design inspired doctrine that embraced air power at the expense of a classic ground maneuver campaign was certainly a major factor in the IDF's disappointing performance. Ground forces performed dismally—the years of training in counterinsurgency operations had diminished its conventional war fighting capabilities. Following years of insufficient training, during which time soldiers with perishable skills related to armored systems were put to use in light infantry roles, the IDF discovered the ineptitude of tank commanders and crewmen who could not use their smokescreen systems, lacked indirect-fire skills, and were not proficient in CAM.¹⁰

In “The 2006 Lebanon Campaign and the Future of Warfare: Implications for Army and Defense Policy,” Dr. Stephen Biddle and Dr. Jeffrey A. Friedman analyze the defense policy implications of adapting the lessons learned from the Second Lebanon War. They argue that the 2006 war is seen in two perspectives. First, some see Hezbollah as an essentially terrorist organization using an information age version of the asymmetric military methods seen as typical of non-state actors historically. The authors state that this view of Hezbollah as a guerrilla force strengthens the case for the redesign of the U.S. Army to reposition it for irregular warfare. Advocates would expand the

Army and Marine Corps and restructure it to deemphasize traditional armor and artillery in favor of light infantry, civil affairs, military police, and special forces capability; and reengineer training and doctrine to stress low-intensity irregular warfare skills and methods rather than conventional combat.¹¹

Second, others see Hezbollah as a major departure from the asymmetric methods of traditional terrorists or guerrillas. Proponents of this view argue that in 2006, Hezbollah shifted towards conventional tactics associated with state actors. The authors state that this view of Hezbollah as a conventional army weakens the case for irregular warfare transformation. This perspective implies that a conventionally-structured U.S. military is better suited for future non-state opponents than one that is focused on LIC. Biddle and Friedman argue that neither of these perspectives is completely consistent with Hezbollah's actions in 2006, but that the second case is closer than the first. They go on to state that Hezbollah in 2006 used methods very different from those commonly associated with guerrilla or terrorist fighters and put much more emphasis on holding ground and seeking concealment through terrain rather than civilian centers.¹² Biddle and Friedman conclude that this model of warfare poses serious challenges for U.S. policy makers as they consider the implications of the Second Lebanon War and the wars of Iraq and Afghanistan. The authors argue that the operations in Iraq and Afghanistan demand capability to defeat current enemies who practice a close approximation of classical guerrilla warfare; whereas Lebanon suggests a possibility for future adversaries who would wage war in more conventional methods. The different demands associated with the different styles of future adversaries leave defense planners with a dilemma: the United States cannot simultaneously maximize its potential for both, but neither prospect

can safely be ignored, requiring a painful choice in which something important must be sacrificed whichever choice is made. Furthermore, the authors argue that there are real risks in changing too little and in changing too much. Biddle and Friedman conclude by stating that what Hezbollah in 2006 shows is that in defense planning there is no such thing as an unambiguous, risk-free policy. There will be trade-offs in the decisions that defense planners make and all options have downsides—“even the options that look most forward thinking.”¹³ This is the exact debate facing U.S. Army senior leaders today, and their decisions regarding force structure will shape the Army for the next conflict.¹⁴

Conclusion

The IDF experience from the Second Lebanon War provides insights relevant to the decisions facing the U.S. Army today. This conflict was the starting point in which the IDF began to reconsider the nature of the future threat, conventional force structure, CAM, and the main battle tank. The 2006 Lebanon War brought many pressing questions to the forefront of political and military policy. From a focus on LIC prior to the 2006 Lebanon War to an understanding of the future hybrid threat after the conflict, the IDF struggled with identifying the character of future conflict and structuring a force to meet its requirements. It is from this starting point that the thesis analyzes IDF force structure changes, CAM concepts, and the role of the Merkava main battle tank. The following chapter provides a methodology in which to analyze Operations Cast Lead and Protective Edge in order to inform the stated problem statement and research questions.

¹ Russell W. Glenn, “Thoughts on ‘Hybrid’ Conflict,” *Small Wars Journal* (March 2009), accessed February 19, 2015, <http://smallwarsjournal.com/jrnl/art/thoughts-on-hybrid-conflict>.

² Johnson, “Hard Fighting,” xv.

³ Ibid., xvi, xvii.

⁴ Ibid., xvii.

⁵ Ibid., xix, xix-xx.

⁶ LTC Scott C. Farquhar, ed., “Back to Basics: A Study of the Second Lebanon War and Operation Cast Lead” (Ft. Leavenworth, KS: Combat Studies Institute, May 2009), 6. Chapter 1 in this monograph is written by Dr. Matt Matthews.

⁷ Ibid.

⁸ Farquhar, 6.

⁹ Ibid., 8-9.

¹⁰ Ibid., 6, 61, 63-64.

¹¹ Stephen Biddle and Jeffrey A. Friedman, “The 2006 Lebanon Campaign and the Future of Warfare: Implications for Army and Defense Policy” (Monograph, U.S. Army War College, Strategic Studies Institute, Carlisle Barracks, PA, 2008), xi.

¹² Ibid., xii-xiii.

¹³ Ibid., xviii-xix.

¹⁴ Ibid., xv-xvi.

CHAPTER 4

METHODOLOGY

In order to inform the problem statement and research questions, the thesis develops insights from the IDF experience in Operations Cast Lead and Protective Edge. To properly frame and test the case studies, the following hypotheses are analyzed:

Hypothesis #1: Hamas exhibited hybrid capabilities that negated the effectiveness of the Merkava on the battlefield.

Hypothesis #2: The force structure required to defeat Hamas during Operations Cast Lead and Protective Edge included a preponderance of conventional capabilities.

Hypothesis #3: Combined arms maneuver is no longer relevant on the battlefield and must be replaced with new concepts in the hybrid environment.

Hypothesis #4: The Merkava tank provides unique mobility, survivability, and precision firepower capabilities.

In order to determine the validity of the proposed hypotheses, the thesis analyzes Operations Cast Lead and Protective Edge using the following methodology:

Hybrid Threat: Examine Hamas preparation of the battlefield, development of anti-tank capabilities, and anti-tank tactics.

Force Structure: Examine the changes in doctrine, force structure prioritization, and training.

Combined Arms Maneuver: Examine the utilization of Combined Arms Maneuver against a hybrid threat.

Main Battle Tank: Examine IDF employment of Merkava tanks during the operation.

Operational Assessment and Insights

As stated in chapter 1, the thesis uses the IDF Merkava main battle tank as an analogous platform to the U.S. M1 Abrams tank because of its similarities in deployment¹ and capabilities to the M1 Abrams tank. To strengthen the linkage, the following section provides an overview of the Merkava's capabilities.

IDF Merkava Main Battle Tank

The Merkava is an advanced main battle tank. It is deployed by the IDF in similar combined arms formations as the U.S. Army, and serves as the centerpiece of Israel's three regular and nine armored divisions (see figure 3). It is the principal instrument through which IDF ground commanders are able to implement Israel's version of "lightning war," a doctrine which calls for the IDF to win all of its battles quickly and decisively and with the fewest possible casualties. The IDF deploys the Merkava across the range of military operations in low and high intensity environments. The tank forms the backbone of the Israeli armored fleet, with nearly 1,300 vehicles in active service. The Merkava, first deployed in the late 1970s, is Israel's only domestically built heavily armored combat system. Its design makes it ideal for force-on-force engagements or the provision of tactical support to Israeli soldiers in low-intensity environments.²



Figure 3. (Left) M1A2 Abrams Main Battle Tank
(Right) Merkava Mk IV Main Battle Tank

Source: Wikipedia, “M1 Abrams,” accessed February 16, 2015, http://en.wikipedia.org/wiki/M1_Abrams; Wikimedia Commons, “Merkava Tank,” accessed February 16, 2015, http://commons.wikimedia.org/wiki/Merkava_tank.

Like U.S. Army leaders, IDF senior leaders, with defense budgets under increasing strain, face mounting pressure from the government to terminate production of the Merkava tank.³ Opponents point to dramatic advances in ATGMs, IEDs, anti-armor mines, refinements in close air support, and the proliferation of unmanned vehicles as evidence that a global revolution in ground combat is now underway. Proponents of the Merkava argue that the advent of more lethal anti-tank weapons, attack aircraft, and long range smart weapons has not diminished the value of the tank but rather has emphasized the need for greater survivability and lethality on the modern battlefield. Faced with the effects of a deep recession, a drop in government revenues, and the rising cost of conflicts in the Gaza, advisors to Israel’s Prime Minister have argued that the Merkava tank program has “simply become unaffordable and must be scrapped.”⁴ The debate between divided parties was first seen in 2003, as Israel’s Ministry of Finance was preparing its Fiscal Year 2004 budget proposal. Opponents of the program proposed halting the manufacture of the Merkava tank as a way of relieving the country’s budgetary pressures. This recommendation reflected a growing split within the ranks of

the military over whether the growing lethality of modern anti-tank weapons was in fact making heavy armored vehicles obsolete. It is clear that the IDF is struggling with similar discussions regarding the role of the main battle tank. For this reason, the IDF provides an aperture for the U.S. Army to analyze its own debates surrounding the M1 Abrams tank.⁵

The indigenous Israeli tank was developed beginning in 1970 and first entered combat units in 1979. Three years later, immediately after the 1982 Lebanon War, the IDF fielded the next generation Merkava Mk II tank platform. The Mk III, introduced in 1989, transitioned the Merkava tank platform from a 105-millimeter to 120-millimeter main gun and instituted a new 900-horsepower diesel engine. Based on lessons learned through operational experience in Lebanon and Gaza, the Mk III integrated updated armor technologies and improved fire control and sight systems. The Merkava Mk IV represents the latest evolutionary phase of the Merkava tank program.⁶

The Merkava shares comparable characteristics with the M1 Abrams tank (see table 3). The Merkava Mk IV is equipped with an improved 120-millimeter gun designed to sustain higher pressures, generating higher muzzle velocities that allow for advanced kinetic munitions. It possesses modern fire control and sighting systems, which include computerized ballistic calculations and stabilized gunner sights. The tank also possesses a type of hybrid modular armor, which can be conformed to match specific threats. For command and control, the Mk IV utilizes the Battle Management System, which provides fast communication networking between the commander and subordinate units. The system is equipped with a new VDS-60 digital data recorder, which can record targets and distribute to other platforms. This capability integrates the digitized land force

concept by networking tanks, helicopters, and other tank platforms in a combined task force. The Mk IV design also features a front-mounted power pack, which clears room at the rear for additional capabilities—transport of infantrymen, evacuation of wounded soldiers, and rear exit for crew-members.⁷

Table 3. Merkava Mk IV and M1A2 Specifications

Main Battle Tank Specifications		
	Merkava Mk IV	M1A2 SEP
Weight	65 tons	69.5 tons
Length incl. Gun Barrel	29 ft 8 in	32 ft
Width (ft)	12 ft 2 in	12 ft
Height (ft)	8 ft 7 in	8 ft
Crew	4 (commander, driver, gunner, and loader)	4 (commander, driver, gunner, and loader)
Passengers	Max 6 passengers	None
Armor	Composite matrix of laminated ceramic-steel-nickel alloy	Depleted uranium mesh-reinforced composite
Main Armament	120mm MG253 smoothbore gun w/ LAHAT ATGM capability	120mm M256 smoothbore gun
Secondary Armament	1x12.7mm (.50 CAL) MG	1x12.7mm (.50 CAL) MG
	2x7.62mm MG	2x7.62mm MG
	1x60mm mortar	
	12 smoke grenades	24 smoke grenades
Engine	1,500 hp V12 water-cooled diesel	1,500 hp multi-fuel turbine engine
Power/Weight	23 hp/ton	26.9 hp/ton
Payload Capacity	48 rounds, 10 ready in an electrical drum	42 rounds
Operational Range	310 miles	265 miles
Speed	40 mph	42 mph

Source: GlobalSecurity, “M1 Abrams Main Battle Tank,” accessed March 12, 2015, <http://www.globalsecurity.org/military/systems/ground/m1-specs.htm>.

This chapter establishes clear parallels between the IDF Merkava and U.S. M1 Abrams tank in armament and weapon systems, chapters 5 and 6 assess Operations Cast Lead and Protective Edge according to the methodology established in this chapter. The IDF experience during these operations serves to inform the future nature of hybrid threats, force structure challenges, relevancy of CAM, and the role of the main battle tank.

¹ Rand H. Fishbein, “Tank Tops and Heavy Metal: Armor’s Enduring Appeal on the Modern Middle Eastern Battlefield” (ACPR Policy Paper No. 156, Ariel Center for Policy Research, Shaarei Tikva, June 2004), 10.

² Ibid.

³ Ibid., 1.

⁴ Ibid.

⁵ Ibid.

⁶ Defense Update, “A Brief History of the Merkava Tank,” *Defense Update: International Online Magazine* 2 (2006), accessed February 2, 2015, <http://defense-update.com/features/du-2-06/merkava-brief.htm>.

⁷ Defense Update, “Merkava Mk 4 Detailed,” *Defense Update: Online Defense Magazine*, last modified August 3, 2006, accessed February 2, 2015, http://defense-update.com/20060803_merkava4.html#.VM_vKcaY1HF.

CHAPTER 5

OPERATION CAST LEAD

Operation Cast Lead provides an excellent case study to analyze the IDF's perspectives of the hybrid threat, conventional force structure, relevancy of CAM, and role of the main battle tank. The IDF integrated numerous lessons learned after the 2006 Lebanon War—foremost among them, the critical role of the Merkava against a hybrid threat with ATGM capabilities. Although Operation Cast Lead was relatively short, it set the foundation for further changes and adaptation by both the IDF and Hamas in ensuing conflicts, and provides insights into the application of doctrinal and training changes during an interwar period.

Hybrid Threat

Terrain

The Gaza strip is approximately forty-one kilometers long and six to twelve kilometers wide. Gaza's population is estimated at 1.5 million people. The whole operating environment is within the max effective range of tank fires, and provides clear lines of sight—"the strip is flat, sparsely vegetated and exposed."¹ The population centers within Gaza are dense, and the urban area, in particular Gaza City, makes collateral damage a concern. As a result, Hamas planned to exploit the urban areas for offensive and defensive purposes—providing cover for forces, movement, and avoiding detection. In preparation, Hamas booby-trapped houses and buildings, placed IEDs in homes, and used its tunnel network to move forces and supplies. Hamas used Gaza's main hospital as a command center and defensive fighting position. The terrain, however, presented

significant disadvantages for Hamas as well: (1) The Gaza Strip is not large, ruling out any real possibility of defense in depth or trading space for time; (2) The centers of power, including Gaza City, are close to the border and the strip is long and narrow, making it vulnerable to division into zones; and (3) There is no serious obstacle along the border or within Gaza, except the urban areas.²

Hamas³

The Izzedine al-Qassam Brigades, the militant section of the Hamas organization, received considerable training and assistance from both within and outside Gaza. Hamas' fighters were mainly trained in Lebanon by Hezbollah, Iran, and Syria. Based on their success in 2006, Hezbollah provided Hamas training in the use of standoff weapons, including ATGMs, MANPADs, and rockets. Furthermore, Hamas procured weapons and ammunition with the help of Hezbollah and manufactured Qassam rockets and a variety of IEDs; the focus was to field weapons that were suitable for urban warfare. Hamas possessed ATGMs (including Sagger missiles), RPGs (including RPG-29s) and a small number of SA-7 MANPADS. Hamas took advantage of the urban areas, using buildings to conceal weapons and rocket launch sites. One of Hamas' objectives was to use civilians and civilian facilities as cover for its military activity. Hamas intended to achieve an image of victory by carrying out acts with more than military significance, such as kidnapping IDF soldiers and destroying tanks. Its goal was not to advance on the ground into Israel, but to defend its territory while continuing to launch rockets into Israel.⁴

Hamas combat forces consisted of two principal elements: the artillery forces (offensive arm) and the ground forces, consisting of combat brigades and supporting

elements (defensive arm). Prior to the operation, Hamas identified and prepared launch sites and created an extensive network of underground tunnels to move from each site. Hamas also possessed mobile rocket launch teams that could move quickly from location to location and react to IDF tactics. The Izzedine al-Qassam Brigades had approximately 2,000 real combat forces, organized into six brigades. Each brigade was task organized with artillery, antitank, antiaircraft, sniper, engineer, and infantry elements (see figure 4).

Hamas Anti-Tank Weapon Systems

<div>Anti-tank Grenade Launcher RPG-7</div> 	<div>Most widely proliferated infantry AT system in the world</div> <div>Light enough to be carried and fired by one person if needed</div> <div>Range: 500m effective, 300m vs. moving target</div> <div>Caliber Launcher: 40mm. Grenade warhead is forward of tube. grenade diameter can be 105mm or more</div> <div>Hamas - with various types of warheads</div>
<div>ATGM Launcher AT-3 SAGGER</div> 	<div>Ground mounted on "suitcase" launcher</div> <div>Crew: 3</div> <div>Rate of Launch: 2 missiles/min</div> <div>Command Link: Wire</div> <div>Range: 3000 m</div> <div>Rangefinder: any portable LRF can be used</div> <div>Reported in Hamas inventory</div>
<div>ATGM AT-4</div> 	<div>Antitank Guided Missiles</div> <div>Crew: 3</div> <div>Rate of launch: 2-3 missiles/min depending on range</div> <div>Command link: wire</div> <div>Range: 2000-4000 m</div> <div>AT-4 seen in photographs of Hamas combatants prior to Cast Lead. AT missiles reportedly fired at IDF armored vehicles during the operation</div>

Figure 4. Hamas Anti-tank Weapon Systems

Source: Created by author using information from Yoram Cohen and Jeffrey White, *Hamas in Combat: The Military Performance of the Palestinian Islamic Resistance Movement* (Washington, DC: The Washington Institute for Near East Policy, October 2009), 9; Department of the Army, TRADOC Intelligence Support Agency, TRISA WEG, *Worldwide Equipment Guide Volume 1: Ground Systems* (Ft. Leavenworth, KS: TRADOC Intelligence Support Agency, December 2011), 2-37, 6-27, 6-30.

After observing the success of Hezbollah in 2006, Hamas shifted focus to the acquisition of advanced weapon systems such as longer-range rockets (from Iran), advanced ATGMs and increasingly powerful IEDs.⁵

Three of the six brigades were in the northern part of the Gaza. All Izzedine al-Qassam Brigades devoted substantial effort to preparing for kidnappings and destroying tanks, but had limited capacity to shoot down combat airplanes or helicopters. With the assistance of Hezbollah-trained experts, Hamas established three lines of defense against a ground invasion: (1) First line of defense was located one to two kilometers inside the border fence, where it planned to draw IDF forces into engagement areas (kill zones); (2) Second line of defense located on the outskirts of Gaza City (most heavily defended), Khan Yunis, and Rafah—the concept was to prevent the IDF from entering the cities: this line possessed heavy mortars (120-millimeter), machine guns, and anti-tank weapons organized in ambushes along anticipated axes of advance; and (3) Third line of defense was inside the urban areas (main defensive zone), where they prepared a complex network of tunnels and created explosive areas with dozens of mines and booby-traps in houses, buildings, and roads (see figure 5).

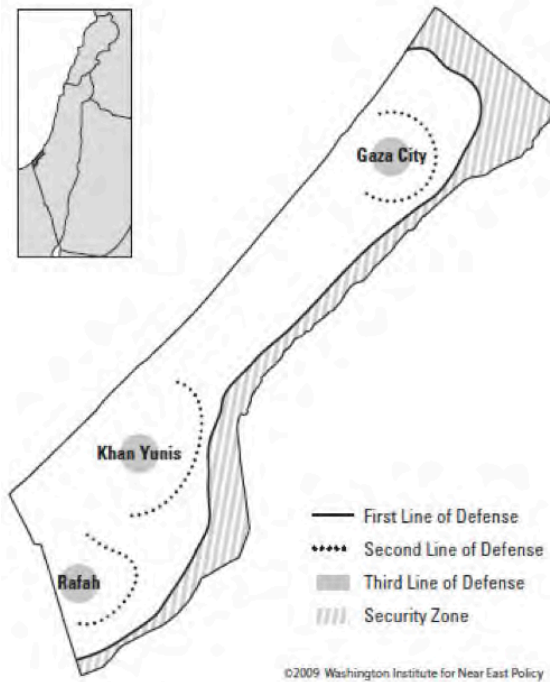


Figure 5. Hamas Lines of Defense

Source: Yoram Cohen and Jeffrey White, *Hamas in Combat: The Military Performance of the Palestinian Islamic Resistance Movement* (Washington, DC: The Washington Institute for Near East Policy, October 2009), 11.

Hamas' tactical plan was to disrupt IDF forces, especially tank platforms, in the first and second line of defense, then draw units deep into Gaza and attack with small arms and ATGM fires. Hamas attempted to use many of Hezbollah's tactics, techniques, and procedures, including destroying tanks with ATGMs.⁶

Force Structure

The 2006 Lebanon War was a wake-up call for Israel. Conditioned for LIC, the IDF ground forces struggled to adapt to Hezbollah tactics, especially its use of anti-tank guided missiles. Hezbollah was reinforced with hundreds of anti-tank missiles, and its

veteran military personnel were prepared to conduct elaborate anti-tank ambushes. The IDF ground forces could not conduct successful land operations in southern Lebanon. As a result, after the operation the IDF, and particularly the Israeli Army, responded to the many investigations of its performance by reevaluating its tank doctrine and operating concepts.⁷

In September 2007, the Israeli government announced a new defense plan, the Teffen 2012, which called for a new emphasis on conventional IDF ground forces.⁸ In particular, the plan included the fielding of hundreds of new Merkava Mk IV tanks (and upgrades of the reserve's older model tanks to the Mk IV standard), the development of a heavy armored personnel carrier (APC) (the Merkava-based Namer APC), and the purchase of upgraded digital command and control systems.⁹ In September 2007, the new Chief of the General Staff, Lieutenant General Gabi Ashkenazi, initiated a five-year military procurement plan that, for the first time in more than a decade, made significant investment in land forces and ground armored platforms.¹⁰ The renewed procurement of Merkava Mk IV tanks stemmed from the IDF's conclusion following the Second Lebanon War that the protection offered by a properly employed tank is still important in modern warfare. As a result, the IDF requested annual resupply of dozens of advanced tanks in order to replace the older, more vulnerable versions that are still in service. The procurement plan was an acknowledgement by senior military leaders of the shifting operating environment: the emergence of hybrid and asymmetric threats that combine modern weapon systems with irregular tactics. Lieutenant General Ashkenazi, an infantryman, set out to strengthen the infantry and armored brigades, "enabling them to move and fight over any terrain facing high threat levels in a fire-saturated

environment.”¹¹ Specifically, the new procurement plan recognized that a lack of modernized heavy armored platforms had severely hindered the IDF’s mobility in Lebanon in the face of ATGMs and mines, and had prevented the application of CAM, which would have contributed to a successful outcome of the operation.¹²

Along with material reforms, the IDF implemented doctrinal reforms that emphasized CAM and fire. To complement the material procurement plan, Lieutenant General Ashkenazi shifted the IDF’s operating concept back to a more traditional construct that emphasized the dominant role of land forces; the priority shifted from small unit counter-insurgency tactics and equipment to offensive maneuver warfare. IDF leaders acknowledged that the IDF had compromised its security during the 2006 Lebanon War “by its reluctance to commit forces using combined arms doctrine,” which was attributed to the casualties inflicted on the opening day by successful Hezbollah anti-armor ambushes using swarming tactics—firing multiple rounds at a single tank.”¹³ Subsequently, the ATGM became the weapon most feared by IDF troops.¹⁴

The IDF also identified and implemented training reforms that reflected an understanding of emerging trends in the operating environment. Prior to the Second Lebanon War, roughly 75 percent of training was focused on LIC and just 25 percent on HIC. After the Lebanon War, the IDF devoted 80 percent of training to high-intensity combined arms training. To replicate combat operations in complex terrain, IDF soldiers trained in a mock Arab city in southern Israel with role players used for civilians, combatants, and the media. The units allocated to Operation Cast Lead (the 35th Brigade Paratroopers, Golani 1st Brigade, Givati 84th Brigade, and Tracks of Iron 401st Armored Brigade) had trained for and rehearsed their missions in Operation Cast Lead for some

time before the operation. As a result, unlike during the 2006 Lebanon campaign, these units were prepared to execute their mission.¹⁵

Combined Arms Maneuver

Although mission, enemy, terrain and weather, troops and support, time and civilian considerations variables ultimately dictated the course of action executed by IDF units, the overall concept of CAM remained the same throughout Operation Cast Lead. IDF units used Merkava tanks, armored infantry vehicles (including the Namer), dismounted infantry elements, and armored engineer assets (primarily the D-9 Dozer), with support from artillery and air assets, to conduct CAM. The main CAM concept is described below in three phases:

Phase 1: The purpose of this phase is to penetrate the enemy's first line of defense and displace the enemy from its defensive positions. IDF units aggressively maneuver and mass firepower in order to breach enemy obstacles. D9 bulldozers and other engineering assets provide avenues of approach when necessary (see figure 6).

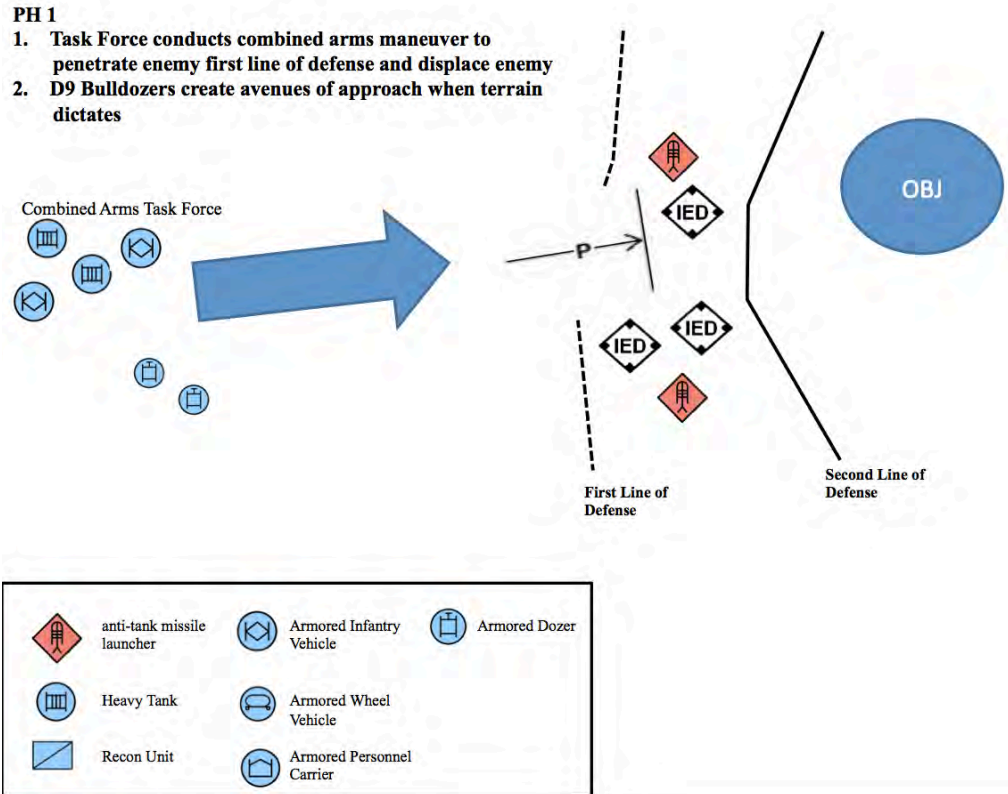


Figure 6. Phase 1: IDF CAM Concept

Source: Created by author using application of tactical symbols; phases of CAM derived based on research of IDF actions during operations.

Phase 2: The purpose of this phase is to seize the objective and neutralize threats. Once the first enemy line of defense is penetrated, combined arms units maneuver to secure the objective outskirts and destroy enemy targets (see figure 7).

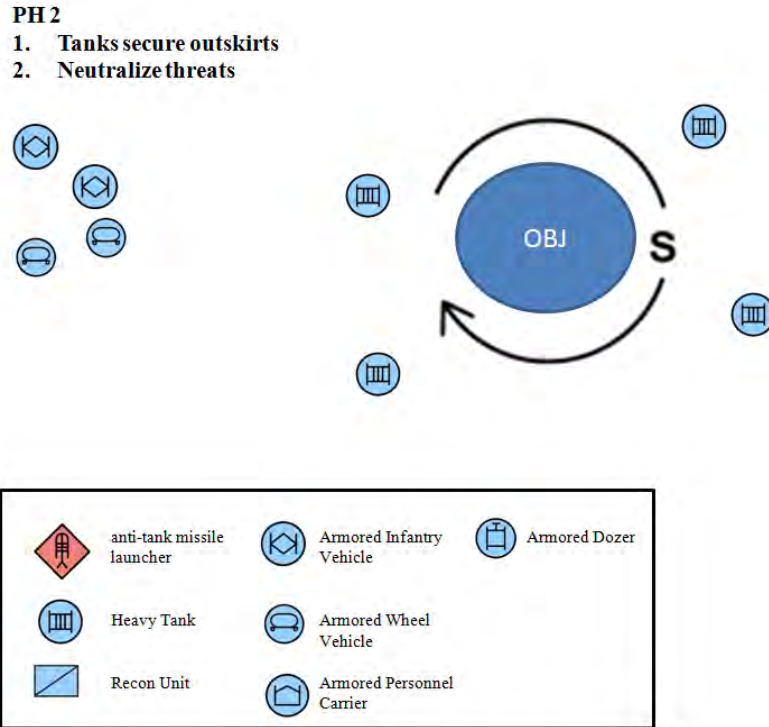


Figure 7. Phase 2: IDF CAM Concept

Source: Created by author using application of tactical symbols.

Phase 3: The purpose of this phase is to seize and clear key infrastructure, and destroy enemy targets. Once the combined arms unit secures the objective, infantry elements conduct missions to meet operation objectives (see figure 8).

PH 3

1. Tanks support infantry in seizing key infrastructure
2. Destroy enemy threats

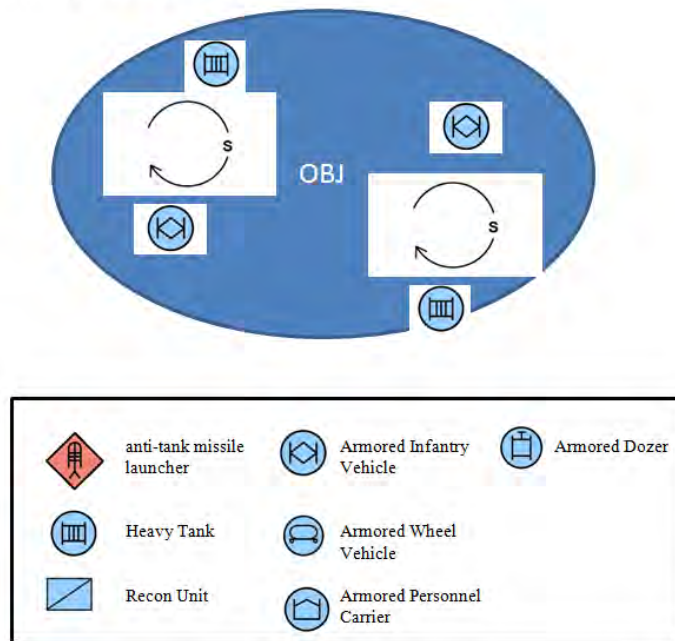


Figure 8. Phase 3: IDF CAM Concept

Source: Created by author using application of tactical symbols.

The IDF configured its armored units into combined arms task forces, integrating UAVs, air assets, artillery, and sophisticated intelligence gathering assets to seize the initiative and mass combat power. The IDF trained to execute combined arms operations in both day and night conditions to defeat Hamas. Unlike in 2006, the IDF was prepared in conventional CAM prior to Operations Cast Lead.

Ground Campaign

On December 27, 2008, Israel initiated Operation Cast Lead in the Gaza Strip. After an initial opening phase concentrated on air attacks, the IDF commenced large-scale ground operations on January 3, 2009. Tactical objectives focused on the targeting

of key Hamas leaders, destroying Hamas' rocket capabilities, and destroying underground tunnels used for smuggling arms, munitions, and personnel into Gaza. Major General Yoav Galant (Southern Command) commanded the overall operation. The Gaza Territorial Division (Southern Command's subordinate command), commanded by Brigadier General Eyal Eisenberg, served as the tactical headquarters that directed the Paratroopers Brigade, the Givati Brigade, the Golani Brigade, the 401st Tracks of Iron Armored Brigade, and several IDF reserve brigades. Each brigade was task organized into a combined arms formation capable of executing offensive and defensive operations against Hamas. The campaign plan called for IDF ground forces to divide north Gaza from south Gaza and take control of Gaza's main north-south highway. Three brigade task forces, with artillery support, attacked Gaza City: the Paratroopers Brigade from the north, Givati Brigade from the south, and Golani Brigade in the center between the two. This allowed the 401st Armored Brigade to isolate Gaza City and effectively cut it off from Gaza's main north-south highway. Two southern command regional brigades occupied southern Gaza in support of operations in Gaza City (see figure 9).¹⁶



Figure 9. Disposition of Forces Operation Cast Lead

Source: David E. Johnson, “Hard Fighting: Israel in Lebanon and Gaza” (Monograph, RAND Arroyo Center, Santa Monica, CA, 2011), 115. RAND Institute application of operational graphics on United Nations Office for the Coordination of Humanitarian Affairs, “Gaza Situation” Map.

Unlike in 2006 when control had been centralized, Southern Command Headquarters allowed brigade teams a high degree of independence and freedom to adapt and innovate. IDF brigades took advantage of several newly developed approaches to fighting in Gaza: (1) The IDF used night warfare for most combat operations because Hamas did not have the technology or training to fight at night; (2) Actual combat

operations involved constant fire to suppress Hamas ambushes, (3) Heavy use was made of infantry to penetrate a given area rather than relying on exposed heavy armor; (4) Operations maneuvered quickly, without prolonged rests or stationary positions (the IDF realized that Hamas, like Hezbollah in 2006, was slow to move and react and create new ambush and concentration points); and (5) Where possible, IDF forces remained away from narrow areas and tight zones of fire. Proceeded by UAVs, the brigades avoided predictable avenues of approach and went in heavy, using maneuver and firepower to preempt ambushes and seize the initiative. The IDF brigades utilized CAM, with the Merkava platform playing a critical role, to force the enemy to react, move from prepared positions, and expose themselves to fires and assaults. Upon approaching objectives or built-up areas, the infantry dismounted to maximize maneuver capabilities and were supported by the Merkava and other armored and engineer capabilities. Throughout the operation, IDF task forces successfully applied the phases of CAM to accomplish its objectives.¹⁷

By the third day of the ground campaign, the IDF had begun to attack Hamas forces at multiple objectives. Brigades' controlled operations gave commanders the freedom to take initiative, and limited the second-guessing that had at times prioritized concern over the risk of casualties over rapid, decisive action. The firepower that preceded the ground attacks, and the rapidity of maneuver, surprised Hamas and drove them from "generally well-organized and well-prepared positions back to improvised positions."¹⁸ As a result, Hamas retreated to urban areas and did not engage the IDF in open areas. The daily IDF operational summaries provide a glimpse into changing Hamas tactics and the IDF's actions in urban areas. The combined arms nature of the IDF force

can be seen throughout the summaries, which consistently state that IDF forces, including infantry, tanks, combat engineers, artillery, and intelligence forces, continued to operate throughout the Gaza Strip with the assistance of the Israel Air Force and Israel Navy. These reports provide a glimpse into the character of urban conflict, describing tunnels rigged with explosives, weapon storage facilities in houses linked by underground tunnels, weapon manufacturing sites, rocket launching sites and bunkers, houses rigged with land mines, direct engagement by anti-tank missiles, and booby-trapped homes, schools, and tunnels.¹⁹

Hamas's objective was to attrit IDF forces and maintain its attacks in urban areas. The IDF in return used combined arms maneuver to suppress enemy ambushes and "preserve the offensive spirit."²⁰ In contrast to the 2006 Lebanon War, the IDF prioritized CAM, aggressively combining mobility and firepower to displace and destroy enemy targets.

Main Battle Tank

During Operation Cast Lead, the IDF employed Merkava tanks to maneuver and clear avenues of approach and secure urban outskirts, allowing infantry units to clear buildings and seize infrastructure. Tanks played a central role in the reestablishment of combined arms capabilities within the IDF.

Although infantry forces provided the main effort in urban areas, the January 11 operational summary provides a glimpse into the utilization of tanks in combat: "armored Corps forces struck various weapons storage facilities, some of them located in the houses of terror operatives. In one case, a tank squad identified a group of operatives planting an explosive device, fired and confirmed hitting them."²¹ In another example,

the Merkava capabilities within the combined arms construct are succinctly summarized in the January 17 operational summary:

IDF forces operating in Gaza identified two armed gunmen hiding in a residential building and targeted them with tank fire. In a subsequent sweep of the building, troops uncovered a stockpile of ammunition, including an explosives belt, grenades, and other weapons . . . in a separate incident, troops identified gunmen armed with an anti-tank missile, and relayed information regarding his position to the Israeli Air Force (IAF), which then carried out a precision strike.²²

Hamas actively sought to reduce the IDF's mobility, particularly the Merkava tank, through the use of IEDs, mines, and ATGMs. Armored platforms, including the Merkava tank, played a central role in reestablishing combined arms capabilities within the IDF. The protection, mobility, and firepower provided by the Merkava allowed aggressive CAM to seize the initiative.

On January 18, 2009, the IDF accepted a ceasefire proposal and withdrew from Gaza. There is no consensus casualty figure; the number of casualties among of Gaza civilians and Hamas fighters is especially disputed. The Israeli government states that of the 1,166 names of Palestinian dead gathered by the IDF's Research Department, 709 have been identified as Hamas terror operatives. The IDF suffered ten fatalities, although dozens were wounded (four of the fatalities seem to have been a result of fratricide—"a risk made much higher by the speed of IDF operations and constant use of quick reaction suppressive fire").²³ The IDF suffered limited equipment losses—Hamas made selective use of the RPG-29 (tandem warhead), one of which penetrated through the armor of a D-9 armored bulldozer. They also made extensive use of IEDs. However, the Merkava Mk II, II, and IV tanks fitted with additional belly armor withstood the majority of the detonations—a few had their armor penetrated by massive ground charges, which

penetrated the engine compartment at the front of the tank. However, unlike the 2006 Lebanon War, the IDF suffered no casualties to tank crewman from IEDs.

Operational Assessment and Insights

Despite attempts to put a positive spin on its performance, Hamas performed poorly and accomplished little militarily against the IDF (although they were somewhat successful in the continuation of rocket fire into Israel, this declined after three weeks of combat). The IDF, integrating lessons learned from the Second Lebanon War, deployed units prepared in CAM. Hamas had no answer to IDF air and ground capabilities.²⁴ Its defensive tactics and use of IEDs were far less successful than anticipated. Generally, the IDF pushed forward step-by-step, not rushing in, and employing heavy firepower while seeking to avoid combat inside densely populated areas. The engagements were primarily fought at the company level and below, and took minutes, not hours, as Hamas largely avoided major close combat actions.²⁵ The Qassam Brigade did not fight effectively against the IDF in the first and second defensive lines. Hamas anti-tank capabilities, which included advanced systems such as the AT-4 Fagot, were not effective, and the extensive system of mines and IEDs failed to halt IDF movement or inflict serious casualties. Hamas had planned to stand and fight, but proved unequal to the task—“fairly early in the fighting, Hamas fighters began removing their uniforms and donning civilian clothing, further increasing the risk to the civilian population.”²⁶ In the first and second lines, under the weight of heavy firepower, Hamas fighters withdrew to urban areas (primarily Gaza City) for cover and concealment. Hamas’ poor performance can also be attributed to the preparation and execution of CAM by IDF units. Already somewhat less

capable than Hezbollah, Hamas found the aggressive maneuvering and massing of IDF firepower to be overwhelming.²⁷

From its experience in 2006, the IDF realized that hybrid threats like Hezbollah must be countered with a “joint, combined-arms approach that enables integrated fire and maneuver, particularly in complex terrain and in military operations [that occur] ‘amongst the people’.”²⁸ During a conference in 2009 sponsored by the IDF, Major General Avi Mizrachi, commander of IDF ground forces, stated, “a war cannot be won without moving forces on the ground . . . only a ground maneuver will end the conflict and win the war.”²⁹ Furthermore, Brigadier General Agay Yehezkeli, chief of the Armored Corps, stated, “in a future conflict with Hezbollah in Lebanon, the IDF [will] need to launch a quick ground operation, heavily depending on tanks, deep into Lebanese territory.”³⁰ The IDF ground forces that went into Gaza were well trained and prepared to execute combined arms operations. “Armored forces—[the Merkava] and heavy armored infantry carriers, adapted to survive against hybrid enemies through the addition of extra armor applied to vehicle bellies and elsewhere—played a key role in Operation Cast Lead.”³¹ Used in conjunction with infantry, the Merkava provided protected mobility and precision firepower, thereby reducing risk and providing commanders increased maneuver options.

A key insight from Operation Cast Lead is that the Merkava tank plays a key role in forcing the enemy to displace from its positions. Hybrid enemies, like Hezbollah and Hamas, have the capability to construct and secure well-defined and hardened defensive positions. It takes armored platforms, such as the tank, to maneuver and force the enemy to expose itself, allowing for the application of ground and air firepower on the enemy.³²

As was the case with Hezbollah, the enemy adapts and makes it increasingly difficult for air assets to locate and target defensive positions. It is important to also note that in Operation Cast Lead, the IDF employed artillery to “paralyze the enemy” and fix their positions, thus allowing ground forces to close with and displace the enemy.³³ The IDF’s application of lessons learned from 2006 proved to be effective. Unlike in 2006, the IDF integrated the Merkava in high tempo CAM with overpower firepower at night to seize and gain the initiative.

Operation Cast Lead offers several important lessons learned that could be applied to the U.S. Army. It is prudent for the Army to analyze this operation to gain insights into hybrid threat trends, force structure challenges, relevancy of CAM, and the role of the main battle tank.

Hybrid Threat. The U.S. Army must recognize the proliferation of ATGM weapons systems. IDF reports state that the ATGM became the weapon most feared by IDF troops.³⁴ Given the success of its use by Hezbollah against the Merkava in 2006 and its appearance in Operation Cast Lead, ATGM procurement by future hybrid threats is highly likely. U.S. Army experience during OIF and OEF led to the development of counter-IED strategy and doctrine; however, counter-ATGM strategy and doctrine do not currently exist. Operation Cast Lead clearly showed the integration of conventional capabilities by hybrid forces (Hamas with ATGMs). The U.S. Army must develop a holistic counter-ATGM strategy to negate this threat.

Force Structure. The U.S. Army must develop a strategy to balance training between low and high intensity environments. Force-on-force training is significantly different from training in urban environments. The United States might adopt the IDF’s

strategy of basing training on threat assessments. The regional alignment initiative provides a method in which armor formations can align gunnery and maneuver training against specific threat environments and capabilities. The U.S. Army must be careful in prioritizing future conflicts as low-intensity, as the IDF did prior to the 2006 Lebanon War. Like IDF tank crews and units prior to the 2006 Lebanon War, many U.S. tank crews have not trained in CAM (let alone companies, battalions, and brigades). It is important that CAM skills are not allowed to further atrophy.

CAM. The IDF's experience during Operation Cast Lead clearly shows the importance of CAM against a pre-positioned hybrid threat with ATGM capabilities. Although the Gaza Strip was narrow, Hamas established zones of defense. IDF reports state that the Merkava played a critical role in surprising Hamas and displacing its fighters from prepared defensive positions. The ability of a conventional force to displace a threat with standoff fire capabilities in prepared defensive positions is critical in hybrid environments. The U.S. Army needs to focus on CAM capabilities in high and low intensity environments. This capability to integrate the elements of combat power to maneuver and force the enemy to expose itself, taking the threat from "amorphous in nature to shaped," is critical in the hybrid environment.³⁵

Main Battle Tank. The Merkava provided precision fires that were critical in attacking ambushes, seizing the initiative, and supporting infantry troops, especially in the urban environment. The weapon systems on a main battle tank are extremely precise. Controlled by a computerized fire control system, these systems can pinpoint targets with extreme accuracy. Throughout the operation, the IDF was able to target Hamas capabilities in densely populated terrain. The main battle tank allowed the IDF to apply

precise firepower at standoff range while minimizing collateral damage. The tank weapon systems were able to engage threats in buildings and alleyways. Tank crewmen targeted Hamas through windows, and were able to apply firepower to specific floors of buildings while minimizing damage to surrounding areas. Secondly, the Merkava provided a mobile and survivable platform that offered unique protection against ATGM and IED threats. Although several Merkava tanks suffered damage to the engine compartment from IEDs, no crewmembers were injured during Operation Cast Lead from ATGMs or IEDs. The main battle tank provides unique protective capabilities in a hybrid environment. Given this demonstrated utility, the U.S. Army should examine the relevance of the M1 Abrams to addressing future threats.

Conclusion

The IDF experience during Operation Cast Lead provides numerous insights into the nature of the hybrid threat, discussions regarding the direction of future force structure, relevancy of CAM, and role of the main battle tank. The IDF integrated lessons learned from the Second Lebanon War to execute successful combined arms operations against Hamas, a hybrid threat, at the tactical and operational levels. Although the Merkava platform proved to be relevant and critical to IDF operations against Hamas, discussions regarding the future of armored platforms even after the operation were robust and contentious. Senior IDF leaders acknowledged the adaptability of the enemy threat and, faced with fiscal constraints, debated the merits of conventional platforms versus emerging technologies. The interwar period between Operations Cast Lead and Protective Edge provides an important analysis of a conventional force considering its doctrine and force structure as it organizes to conduct combat operations. The following

chapter provides an analysis of these discussions and details the execution of concepts during Operation Protective Edge.

¹ Johnson, “Hard Fighting,” 101.

² Johnson, “Hard Fighting,” 101; Cohen and White, 11; Farquhar, 69.

³ Dr. Jeffrey White, Senior Analyst, Washington Institute for Near East Policy, interview with author, Alexandria, VA, February, 2015. This discussion greatly informed the composition and actions of Hamas during Operation Cast Lead. As one of the leading analysts of Hamas operations in the Gaza strip, Dr. White provided invaluable context regarding the operating environment.

⁴ Johnson, “Hard Fighting”; Cohen and White, ix-x.

⁵ Cohen and White, 6; Farquhar, 50.

⁶ Cohen and White, 9-12; Farquhar, 68.

⁷ Johnson, “Hard Fighting,” 86; Farquhar, 8, 63.

⁸ Johnson, “Hard Fighting,” 97.

⁹ Farquhar, 86.

¹⁰ Ibid.

¹¹ Ibid.

¹² Johnson, “Hard Fighting,” 97; Farquhar, 86.

¹³ Farquhar, 89.

¹⁴ Johnson, “Hard Fighting,” 100, Dr. Johnson email exchange with Israeli academics, January 22, 2011; Farquhar, 89.

¹⁵ Johnson, “Hard Fighting,” 101, Dr. Johnson discussions with IDF officers, Tel Aviv, March 2-5, 2008 and February 8-19, 2009; Farquhar, 89.

¹⁶ Farquhar, 90-92, 95; Johnson, “Hard Fighting,” 114-115

¹⁷ Anthony H. Cordesman, “The ‘Gaza War’: A Strategic Analysis” (Report, Center for Strategic and International Studies, Washington, DC, February 2009), 38-40; Farquhar, 92.

¹⁸ Johnson, “Hard Fighting,” 117.

- ¹⁹ Cordesman, 41-42.
- ²⁰ Farquhar, 93.
- ²¹ Cordesman, 49.
- ²² Ibid., 56.
- ²³ Ibid., 57.
- ²⁴ Cohen and White, ix.
- ²⁵ Ibid., 14-15.
- ²⁶ Ibid., 15.
- ²⁷ Ibid.
- ²⁸ Johnson, “Hard Fighting,” 126.
- ²⁹ Ibid., 124.
- ³⁰ Ibid.
- ³¹ Ibid., 134.
- ³² Ibid.
- ³³ Ibid.
- ³⁴ Ibid.
- ³⁵ Ibid., 124.

CHAPTER 6

OPERATION PROTECTIVE EDGE

Operation Protective Edge provides a robust case study of combat between a conventional force and a hybrid threat. The IDF integrated lessons learned from Operation Cast Lead and adapted changes in tactical force structure, tank armament, munitions, and combined arms concepts. Similarly, Hamas integrated new offensive and defensive tactics to counter IDF CAM and deployment of the Merkava during Operation Protective Edge. This chapter analyzes the adapting capabilities of Hamas, examines IDF force structure and concept changes, and evaluates the performance of the Merkava.

Hybrid Threat

During Operation Protective Edge, Hamas demonstrated the ability to learn and adapt by displaying a wide range of combat capabilities. During the interwar period, Hamas procured thousands of enhanced rockets, increased protection of its military infrastructure from Israeli attack, developed a system of underground tunnels, and improved effectiveness and cohesion of its ground combat forces. Prior to the operation, Hamas focused on three principle elements: rocket forces, ground forces, and the tunnel system. Hamas expended considerable effort in the build-up of its ground forces. Its objective was to prevent IDF penetration into Gaza by deploying dense systems of IEDs, anti-tank forces, mortar units, and snipers. Rocket units and ground combat forces utilized tunnels to penetrate Israeli border defenses without detection and attack targets inside Israel with the advantage of surprise (see figure 10). The IDF discovered thirty-two offensive tunnels—several with exit points within 500 meters of the Israeli border.¹



Figure 10. Hamas Tunnel Network Operation Protective Edge

Source: LTC Ido Mizrachi, “Protective Edge” (PowerPoint Presentation, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, August 26, 2014). Author discussion with LTC Mizrachi provided unique perspectives on the IDF experience in 2014. LTC Mizrachi provided the author a PowerPoint brief that summarized IDF actions and lessons learned from Operation Protective Edge.

Hamas assault squads armed themselves with RPGs, light machine guns, assault rifles, and hand grenades. Hamas personnel, in some cases, wore IDF uniforms to increase confusion and hesitation on the part of IDF soldiers. Hamas deployed six brigades (each having between 2,500 and 3,500 men) tasked with defending a border sector against IDF penetration. The brigades were grouped together under a regional commander and possessed a mix of forces, including rocket and mortar units, anti-tank units, snipers, and infantry. Hamas defense forces prioritized preparations for close combat, including direct fire engagements with IDF forces. They prepared and employed short-range rockets and ATGMs to support defense forces. Hamas integrated IED, anti-tank, and sniper capabilities in densely populated areas. They moved between key

infrastructure using a sophisticated network of tunnels and routes. Figure 11 below depicts the extensive preparation and integration of positions in a densely populated terrain.²

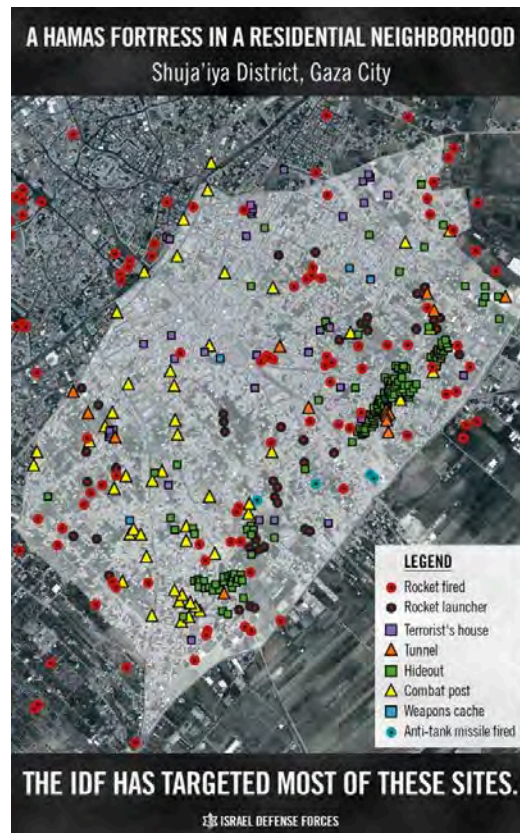


Figure 11. IDF Template of Hamas Infrastructure in Shuja'iya

Source: Israeli Defense Forces, “Shuja’iaya: A Hamas Terror Fortress,” Israeli Defense Forces Blog, accessed April 28, 2015, <https://www.idfblog.com/operationgaza2014/#Shujaiya>.

As Hamas adapted its tactics from Operation Cast Lead to Protective Edge, IDF leaders debated force structure decisions to anticipate changes in enemy capabilities.

These discussions led to diverging views on the future character of warfare and the force construct required to meet its demands.

Force Structure

The interwar period between Operation Cast Lead and Operation Protective Edge illustrates the ongoing debate regarding traditional armor platforms and the character of future warfare. Contrasting views of the nature of future threats and appropriate prioritization in an era of budgetary constraints led to the development of two opposing schools of thought. In December 2013, the Begin-Sadat Center for Strategic Studies, a leading Israeli think-tank, held a conference to discuss this very issue; the thesis adopts the concept and naming convention used by this conference for the conservative and revisionist schools of thought to analyze the current debate in the U.S. Army.

As explained during the conference, the revisionist school of thought argued that the IDF should invest primarily in air power, intelligence, special operations forces, and stand-off precision fire and cyber capabilities, while the conservative school of thought expressed concerns that the build-up of these capabilities at the expense of the ground conventional force would weaken the IDF and make it too dependent on technology. IDF Chief-of-Staff, Lieutenant General Benny Grantz stated that the IDF would not likely fight a conventional army force in the foreseeable future, nor have to conduct large-scale ground maneuvers in enemy territory. His views were supported by Brigadier General Avigdor Klein, former Chief of the Armored Corps, who voiced his approval for reductions in armored forces, and Brigadier General Gal Hirsh, a division commander during the Second Lebanon War and deputy of the IDF Depth Command (a command formed in 2011 to coordinate the IDF's long-range operations deep in enemy territory),

who argued that the use of flexible special operations forces equipped with excellent intelligence provided the best response for the current threat posed by various terror organizations.³

The strongest critique of this revisionist school of thought came from Major General Gershon Hachon, a conservative thinker and outgoing northern Corps Commander. General Hachon argued that the IDF has become too dependent on technological solutions, and had not developed effective strategies to cope with new threats:

Military doctrine is a function of culture; it is never universal but is rooted in time and place. For years the hallmark of the IDF was the initiative and creativity of individual soldiers. Instead of the ‘art of war,’ today the IDF has become obsessed with the ‘science of war’—statistics and numbers of targets hit—but this does not necessarily measure effectiveness. The IDF needs to maintain its ability to adapt to changing circumstances just like some of its rivals are doing. Technology cannot solve everything!⁴

Major General Hachon warned the IDF not to neglect its ability to deploy a mass army. A “smart and small army based on special forces is a nice slogan, but sometimes the events dictate the need for large forces to operate.”⁵

The conference, which was held prior to the outbreak of Operation Protective Edge, was attempting to prioritize and balance the following strategic challenges:

- (1) Requirement to conduct operations against terror and guerilla organizations;
- (2) Technological developments that present new possibilities on the battlefield (drones, UAVs, networks of digital command and control, precision fires that can be launched from any platform, and cyber warfare); and (3) Shift in domestic politics—the large civil demonstrations in 2011 reflect a change in the priorities of the Israeli public: “more butter, fewer guns”—resulting in growing public pressure on the IDF to become more

effective and less costly.⁶ Budgetary constraints influenced discussions regarding the future character of warfare. Dramatic cuts to the IDF budget forced the army to choose between two options: either strengthen the IDF's identified weaknesses—especially maneuver-oriented ground forces, or strengthen its relative strengths: stand-off fire, intelligence, cyber and special forces.⁷ Budgetary constraints threatened the future development of armored platforms, integration of active armor protection systems, the number of armor units, and armored training.

While senior military leaders discussed the future of heavy armor platforms, the IDF made significant improvements to armor formations and the Merkava Mk IV after Operation Cast Lead. Based on their experience in the Second Lebanon War, the IDF predicted that the future threat would maintain low signatures by assimilating in populations and preparing hidden fortified positions, conducting defense in depth with ATGMs and rockets, and continuing to use guerilla and irregular tactics while expanding into underground warfare. The IDF identified their operational needs as the following: (1) Dealing with enemy anti-tank capabilities; (2) Executing C2 in a world full of data and capabilities; (3) Conducting combat in “closed areas;” and (4) Applying rapid and precise fire capabilities.⁸ Based on this assessment, the IDF developed and adopted an innovative anti-ATGM protection system, improved munitions for combat in closed areas, and integrated a support company within the battalion task force to aid the movement and survivability of the tank. The research and development programs initiated after the Second Lebanon War came to fruition during Operation Protective Edge.

Combined Arms Maneuver

The CAM concept executed during Operation Cast Lead proved to be effective. Following this operation, the IDF applied lessons learned to better counter the adversary and increase capabilities; one area in which such improvements paid off was subterranean warfare. During Operation Cast Lead, subterranean warfare was minimal. However, with the integration of extensive tunnel networks by Hamas, the focus of combined arms during Operation Protective Edge was to seize, detect, and demolish both combat and cross-border tunnels.⁹The IDF objective was to destroy key Hamas tunnel systems and restore security to Israeli civilians threatened by rocket fire. Given this mission, the IDF applied CAM to seize key tunnel entrance sites (see figure 12).

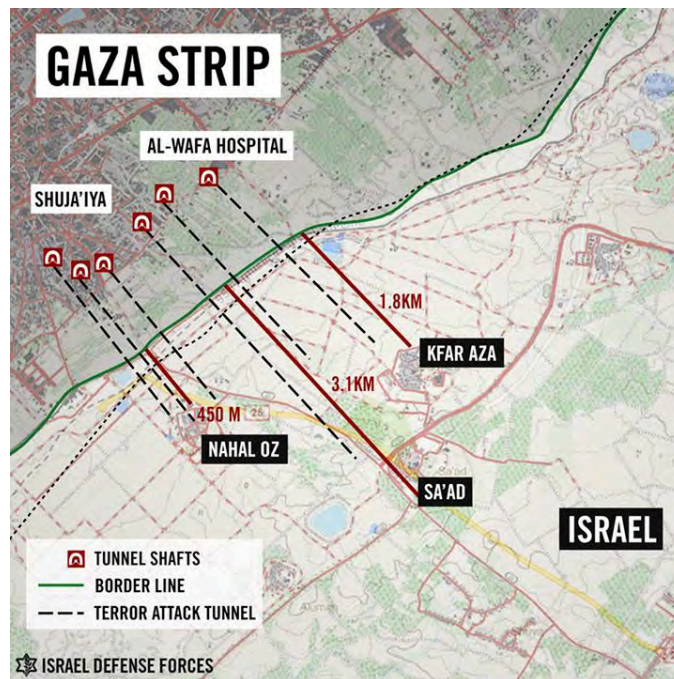


Figure 12. Hamas Tunnel Network

Source: Israeli Defense Forces, “The Gaza Underground,” Israeli Defense Forces Blog, accessed April 28, 2015, <http://www.idfblog.com/operationgaza2014/#Tunnels>.

The IDF adapted their CAM concepts to close in and seize key objectives and secure tunnel entrances. The IDF incorporated a “support company”—consisting of an observation platoon to support in detecting enemies, a recon platoon to detect maneuver paths, and mortar platoon for fire support—in the battalion task force to enhance their combined arms maneuverability (see figures 13 and 14).¹⁰

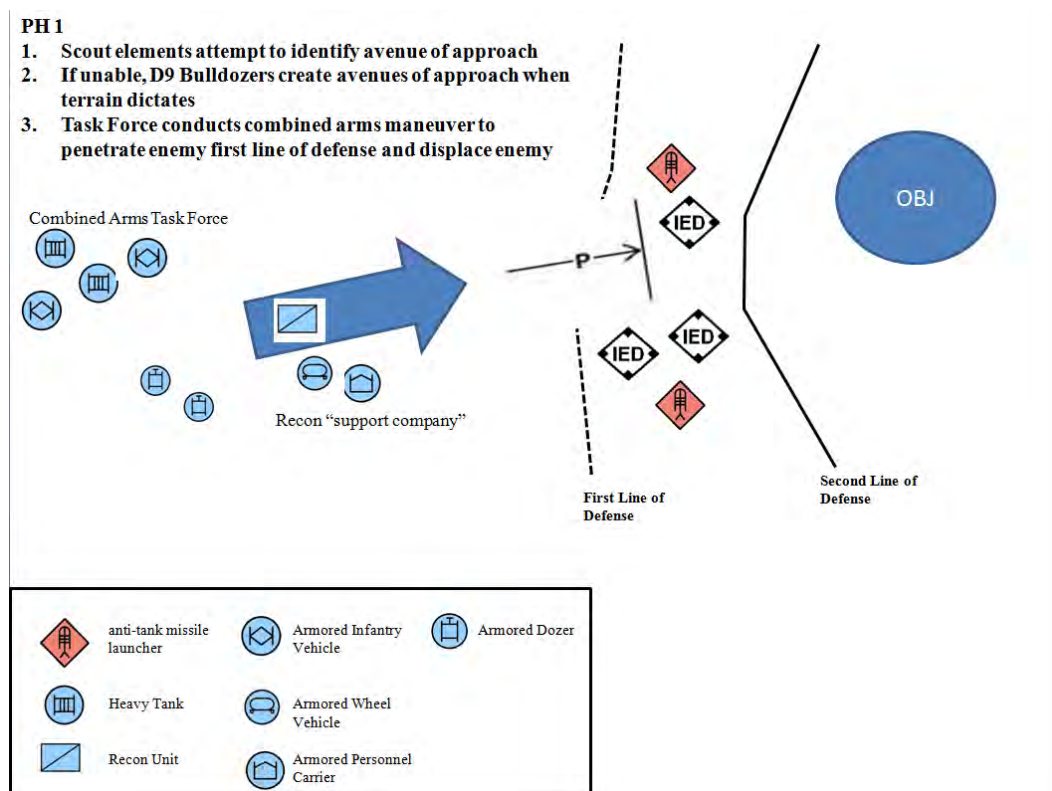


Figure 13. Changes in Phase 1: IDF Combined Arms Maneuver Concept, Integration of Support Company

Source: Created by author using application of tactical symbols.

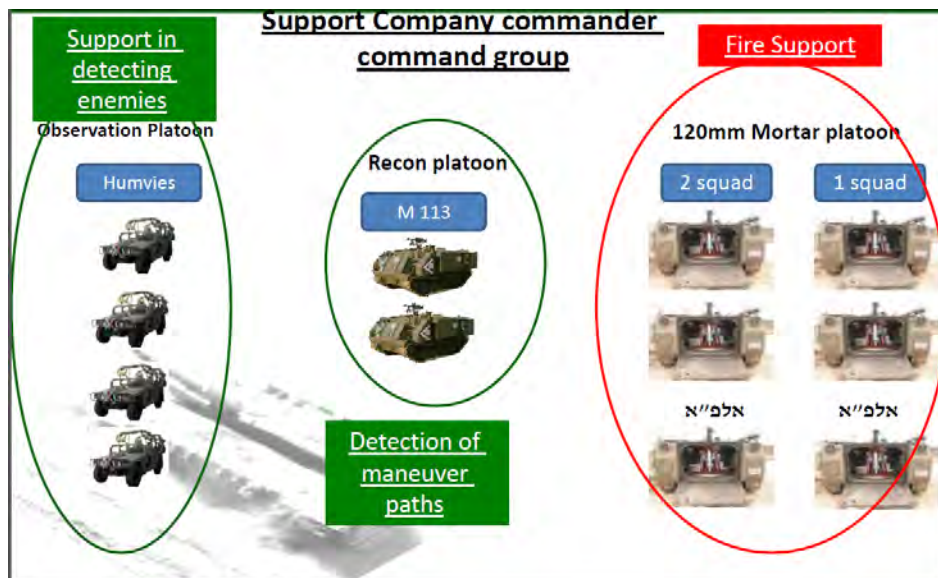


Figure 14. Task Organization: Reconnaissance Support Company

Source: COL Ido Haim, “The Armor Corps on Operation Protective Edge” (PowerPoint Presentation, Army Maneuver Center of Excellence, Ft. Benning, GA), slide 15.

There were no changes to Phase 2 (Securing Objective Outskirts) and Phase 3 (Seize Infrastructure and Destroy Enemy Threats) of the concept (see figures 15 and 16).



Figure 15. Phase 2: Securing Objective Outskirts—Tanks Securing Objective during Operation Protective Edge

Source: COL Ido Haim, “The Armor Corps on Operation Protective Edge” (PowerPoint Presentation, Army Maneuver Center of Excellence, Ft. Benning, GA), slide 35.



Figure 16. Tanks in Support of Infantry Operations Destroy Enemy Targets

Source: COL Ido Haim, “The Armor Corps on Operation Protective Edge” (PowerPoint Presentation, Army Maneuver Center of Excellence, Ft. Benning, GA), slide 28.

Ground Campaign

The IDF initiated ground operations on July 8, 2014. IDF operational objectives were the restoration of security to Israeli civilians living under Hamas rocket fire and the dismantling of the Hamas tunnel network used to infiltrate Israel.¹¹ During the initial aerial phase (ten days), the Israeli Air Force attacked 1,950 targets in the Gaza Strip using hundreds of tons of ordnance. Because the Israeli Air Force could not resolve the tunnel threat from the air, the IDF shifted to ground operations and maneuvered two miles inside the Gaza Strip with brigade task forces augmented with engineer and special forces elements (see figures 17 and 18).¹² The IDF Southern Command led the operation with elements of the Gaza Division, 162d Armored Division, 36th Armored Division, Yahalom Special Operations Engineer Unit, and Maglan Special Operations Unit.



Figure 17. Disposition of Forces Operation Protective Edge

Source: Author application based on information from Central Intelligence Agency, "Gaza Strip," *The World Factbook*, accessed January 10, 2015, <https://www.cia.gov/library/publications/the-world-factbook/geos/gz.html>; disposition of forces developed by Dr. Jeffrey White, Senior Analyst, Washington Institute for Near East Policy, Washington, DC.

IDF Southern Command

Note: the task org below does not denote full commitment of forces, some units deployed elements of its formations

Gaza Division (Gaza Border and Southern Gaza Strip)	162d Armored Division(Northern Gaza Strip)
- Gefen Territorial BDE	- 401 st AR BDE (Merkava Mk 4 w/ Trophy System)
- Katif Territorial BDE	- Nahal IN BDE
- Givati IN BDE	- Reserve BDE of Officer Cadet School
- 188 th AR BDE	
36 th Armored Division (Central/North Central Gaza Strip)	Yahalom Special Operations Engineer Units
- 7 th AR BDE (Central/North Central)	Maglan Special Operations Unit
- Paratrooper BDE (Central)	
- Golani IN BDE (Central)	

Figure 18. IDF Task Organization Operation Protective Edge

Source: Developed by Dr. Jeffrey White, Senior Analyst, Washington Institute for Near East Policy, Washington, DC.

The Israeli ground phase had two major goals: severely damaging Hamas' subterranean network and destroying Hamas' forces and infrastructure. Armor formations employed firepower to undermine Hamas from safe distances. IDF elements maneuvered tanks and D-9 bulldozers into Hamas compounds, which were followed by infantry forces that swept buildings for tunnels and weapons. The IDF successfully utilized CAM to rapidly close with and destroy enemy targets, and seize key infrastructure. The application of CAM allowed IDF task forces to secure and destroy a significant portion of the Hamas tunnel network system.¹³

Main Battle Tank

Modernization

The Second Lebanon War and Operation Cast Lead displayed the dangers of enemy ATGM capabilities. The destruction of the Merkava platform in Lebanon initiated

the development and integration of active armor protection systems. The IDF adopted the Trophy Active Protection System (APS), developed by Rafael Advanced Systems Limited (also known as Windbreaker and Aspro A) in December 2010 after an anti-tank missile in the Gaza Strip damaged an IDF tank. The Trophy APS system employs a network of four radar sensors covering a 360-degree hemisphere around the protected tank (see figure 19).¹⁴ The radars are integrated with the Merkava Mk IV's battle management system providing instantaneous detection of a missile or projectile fired at the tank. If equipped with a Laser Detection System, the system can identify the location of the threat prior to the deployment of the missile or projectile (ATGMs, such as the Kornet-E, uses a laser beam to track targets).¹⁵ The system informs the crew of the location of the firing source, even while the missile is in the air, allowing them to engage the threat and effectively suppress or eliminate the threat altogether.¹⁶



Figure 19. Trophy System Intercepting RPG-29 during Operation Protective Edge

Source: COL Ido Haim, “The Armor Corps on Operation Protective Edge” (PowerPoint Presentation, Army Maneuver Center of Excellence, Ft. Benning, GA), slide 21.

Using network-centric connectivity, the location of the target can also be transferred to other weapon systems and platforms in the formation. The kill mechanism of the Trophy System, (activated when the projectile reaches a specified distance from the tank) utilizes multiple explosively formed projectiles to counter the missile. Mounted on a rotating pedestal, this module points to the direction of the incoming threat and projects a sheath of melted fragments to destroy the threat. This hard-kill countermeasure is effective against all types of ATGMs, anti-tank rockets, and high-explosive anti-tank

projectiles. Furthermore, the Trophy APS system is considered the only effective countermeasure against tandem warhead systems, such as the RPG-29. The Trophy System can simultaneously engage multiple threats arriving from different directions and is effective on stationary or moving platforms.¹⁷

Along with the APS, the IDF integrated new tank munitions to increase effectiveness in urban environments: (1) Kalanit 120-millimeter shell, M329 Anti-Personnel/Anti-Materiel multi-purpose tank round; and (2) Hatzav 120-millimeter shell, M339 high explosive multi-purpose tank round. Israel Industries Military Limited developed the Kalanit round after analyzing lessons learned from the Second Lebanon War and Operation Cast Lead. The round allows the tank crew to choose between two different modes: (1) can be shot just above personnel (such as anti-tank crews), stops midair, and explodes into six difference charges scattering thousands of deadly fragments (see figure 20); and (2) can be used against fortified structures, which the shell first penetrates and then explodes inside (see figure 21).¹⁸



Figure 20. Kalanit, M329, Anti-personnel Mode

Source: Danny Shirding, “APAM-MP-T 120mm, XM329” (PowerPoint Presentation, National Defense Industrial Association 42nd Annual Armament Systems: G&M Systems, Charlotte, NC, April 23-26, 2007), slide 10, slide 12.

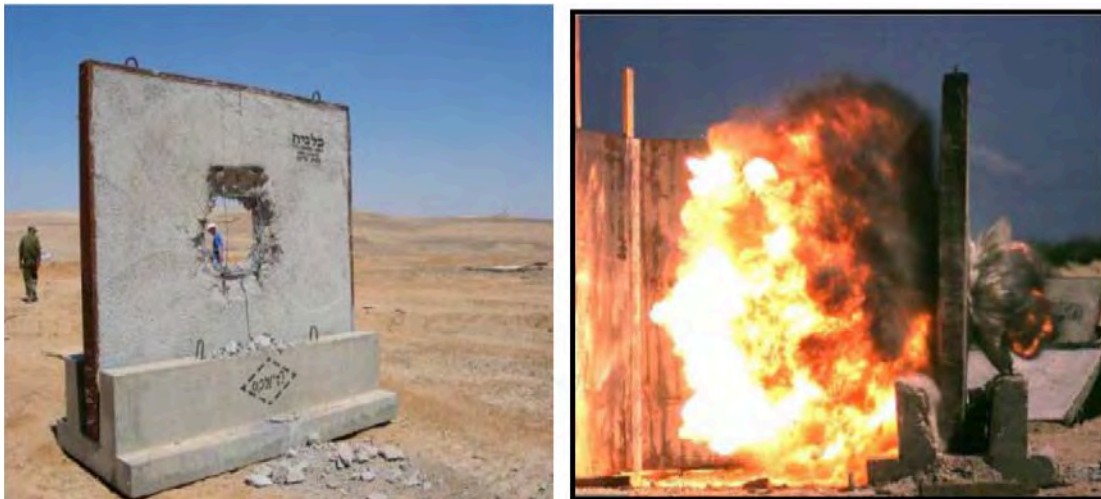


Figure 21. Kalanit, M329, Anti-material Mode

Source: COL Ido Haim, “The Armor Corps on Operation Protective Edge” (PowerPoint Presentation, Army Maneuver Center of Excellence, Ft. Benning, GA), slide 26.

The Hatzav round, in the family of the Kalanit munition, possesses a versatile munition warhead; the round provides an easy-to-operate solution for fighting in urban

environments. The M339 uses an electronic fusing system and has three modes of operation: point detonation delay, point detonation super quick and air burst; an inductive setter sets the mode of operation. In point detonation delay mode, the round penetrates targets, such as double reinforced concrete walls or light armored vehicles, and explodes inside, releasing thousands of controlled fragments (see figure 22). In point detonation delay (super quick) mode, the round breaches a hole in double reinforced concrete walls—two rounds can create a passageway allowing infantry soldiers to pass through the wall. In air burst mode, the round effectively engages anti-tank or infantry squads operating in the open or hiding behind defilades or walls.¹⁹



Figure 22. Hatzav Round through Barrier and Upper Floor Strike during Operation Protective Edge

Source: COL Ido Haim, “The Armor Corps on Operation Protective Edge” (PowerPoint Presentation, Army Maneuver Center of Excellence, Ft. Benning, GA), slide 27, slide 28.

The implementation of new tank munitions allowed the IDF to counter emerging enemy capabilities on the battlefield. These new rounds increased the IDF’s ability to target ATGM and rocket teams, and destroy enemy targets in urban terrain. The

integration of the APS and improved munitions provided the tools necessary to counter Hamas.

Merkava Utilization and Performance

At the outset of operations, the immediate IDF objective was to neutralize Hamas attack tunnels. The IDF focused initial ground operations in the narrow strip separating the Gaza Strip from Israel. They combined efforts by infantry, tanks, and combat engineering troops to identify and destroy the tunnels. Hamas utilized a complex network of tunnels, with a number of entry and exit shafts; tunnel routes often split and sometimes possessed parallel routes.²⁰ Combat operations in Shuja'iya provide a glimpse into the utilization of Merkava tanks in urban terrain, and the extensive preparation of Hamas defensive networks.

The battle in Shuja'iya began on July 19; two days after Israel launched a ground offensive focused on finding and demolishing Hamas' cross border attack tunnels and rocket launch sites.²¹ The residential neighborhood in Gaza City lies just over the border from Israel (see figure 23).



Figure 23. Battle of Shuja'iya

Source: Israeli Defense Forces, “Shuja’iaya: A Hamas Terror Fortress,” Israeli Defense Forces Blog, accessed April 28, 2015, <https://www.idfblog.com/operationgaza2014/#Shujaiya>.

Hamas developed extensive terrorist infrastructure throughout the neighborhood and IDF intelligence estimates that over 140 rockets were fired from this location into Israel during Operation Protective Edge.

The battle began when Israeli troops supported by Merkava tanks entered the densely populated Shujai’ya district. The IDF encountered significant resistance from Hamas who fired anti-tank missiles, rocket-propelled grenades, and weapons from houses and buildings. Operation Cast Lead veterans stated, “this [was] not the Hamas of [2008], but a far more organized force that has adopted many of the same tactics and weapons seen in the fierce 2006 urban warfare in Lebanon.” An IDF officer stated that he had never seen Hamas “like this before . . . [their] equipment and tactics [were] just like Hezbollah.”²² Hamas incorporated anti-tank ambushes and IEDS everywhere in

Shuja'iya and did not flee immediately as in previous engagements. A prime example of Hamas improved capabilities was their destruction of an APC by an anti-tank missile that killed seven IDF soldiers. Hamas used anti-tank missiles (including the Kornet and RPG-29) and booby trapped the entrance to tunnels and homes. Overall, thirteen soldiers were killed in separate incidents in Shuja'iya. The seven-hour battle ended with a cease-fire. The Battle of Shuja'iya demonstrated the capabilities of a hybrid threat that possessed significant anti-tank capabilities, restricted mobility through IEDs, and utilized the urban terrain to their advantage.²³ The Merkava tank provided protection to IDF units as they conducted operations in complex and dense terrain.

Along with the battle of Shuja'iya, the Merkava played a central role in CAM in numerous operations during Operation Protective Edge. The Merkava secured the “outskirts” of urban areas, provided protective firepower in seizing tunnel sites, disrupted Hamas prepared positions and hideouts, and allowed infantry soldiers to enter and clear buildings (see figure 24).²⁴



Figure 24. Tanks Closing in and Securing Urban Outskirts and Neutralizing Targets during Operation Protective Edge

Source: COL Ido Haim, “The Armor Corps on Operation Protective Edge” (PowerPoint Presentation, Army Maneuver Center of Excellence, Ft. Benning, GA), slide 33.

Hamas elements appeared more effective and aggressive than previous conflicts, surprising Israeli forces with coordinated fire. Although IDF formations seem to have won most of the close combat actions, Hamas fighters inflicted casualties on even the best Israeli infantry and armored formations. A key focus for Hamas during this operation was actions against the Merkava. Hamas formed specialized anti-tank units equipped with a variety of ATGMs and RPGs, including (reportedly) the Malyutka, Konkurs, Fagot, and Kornet variations.²⁵ RPGs included the RPG-7 and the tandem warhead RPG-29. Hamas adopted a multi-prong tactic against the Merkava: engaging it at long range with ATGMs while deploying small anti-tank elements in close combat. Hamas also used

IEDs and mines against Merkava formations to draw them into prepared ambushes where “all anti-tank means could be brought to bear.”²⁶

The Merkava IV equipped with the Trophy APS proved to be critical in countering Hamas anti-tank capabilities. During Operation Protective Edge, a total of 571 Merkava tanks were used in varying missions: 439 tanks as part of offensive operations, sixty-six tanks as part of the defense effort on the Gaza Strip; and sixty-six tanks in routine operations in the Northern Command. Merkava tanks fired 22,269 rounds including the M339 multi-purpose tank round. No Merkava tanks were destroyed, and the Trophy APS intercepted four anti-tank missiles.²⁷ IDF armor forces experienced fourteen killed in action, nine severely wounded, twelve moderately wounded, and 219 ambulatory injuries. The Trophy System proved to be, not a defensive system, but an offensive one allowing armored formations to maneuver with speed and depth without limitations posed by anti-tank missiles.

The Merkava Mk IV played a central role in CAM during Operation Protective Edge. They provided the protection and mobility needed to seize the objective tunnel sites and displace or destroy Hamas fighters. The Battles of Shuja'iya displayed the significant resistance and capabilities of Hamas, and the role of mobile firepower in densely populated urban terrain.

Operational Assessment and Insights

At the tactical and operational level, Operation Protective Edge proved to be a success for the IDF. The IDF successfully integrated changes in force structure, CAM, and Merkava capabilities to defeat Hamas.

Operation Protective Edge proved that Hamas is a learning organization. Although defeated at the tactical level, it is clear that Hamas applied the lessons learned during Operation Cast Lead to execute operations during Operation Protective Edge that steered its tactical fighting doctrine away from Israel's strengths. Hamas continued to fight from within the population because it understood the constraints placed by the presence of civilians on IDF forces, and developed an extensive tunnel network to negate Israeli firepower. Extrapolating their tactics to the future, Hamas will likely increase the number of anti-tank units and weapons and develop methods to counterattack the deployment of the Merkava and the Trophy APS system. It can be derived from Operation Protective Edge, that hybrid threats will utilize unconventional tactics (fighting among the populace, dispersion, etc.), counter opposing force strengths (underground warfare), and increase its conventional capabilities and weapons systems (anti-tank capabilities).²⁸

The Merkava played a central role in the execution of missions for the IDF. With a focus on conventional combined arms task forces augmented with ISR and intelligence, the IDF executed CAM to meet its tactical and operational objectives. The aggressive use of CAM allowed the IDF to seize and secure key infrastructure, and neutralize the Hamas tunnel threat. Through speed of maneuver and application of firepower, the IDF were able to penetrate Hamas defenses and destroy rocket launch sites. The integration of infantry, armor, artillery, and engineer assets allowed the IDF to overwhelm, displace, and destroy Hamas elements.

Tactically, the Merkava provided unique mobile, protective, and precision firepower capabilities on the battlefield. The Trophy APS system provided maneuver

options for commanders, as the fear of ATGMs no longer constrained their movement. Second Lieutenant Jeff Ben-Ari, a platoon commander in the 401st Armored Brigade states, “the capabilities of the Trophy reflected during Operation Protective Edge . . . A group of armed Hamas terrorists fired a RPG-27 anti-tank missile at one of our company tanks, but the Trophy System intercepted it before it reached the tank.”²⁹ Additionally, the Merkava continued to prove that there is still a significant psychological aspect to the presence of tanks in urban warfare; Hamas fighters withdrew from engagements when Merkava tanks appeared.³⁰ Tanks played a central role in displacing and exposing hybrid threats defending from fortified defensive positions and urban infrastructure. Lastly, the Merkava provided precision firepower capabilities in densely populated terrain, allowing discretionary firepower throughout the operation.

Operation Protective Edge offers several important lessons learned for the United States. It is prudent for the U.S. Army to assess the capabilities of the IDF and Merkava during Operation Protective Edge to inform its own force structure.

Hybrid Threat. There are two trends that may affect future operations for the U.S. Army. First, hybrid threats will have greater access to anti-tank capabilities. From Operation Protective Edge, it was evident that the availability and proliferation of anti-tank capabilities drastically increased from 2008-2014. Second, Operation Protective Edge introduced the first military operation where a modern army had to face an irregular enemy in the subterranean operational environment.³¹ Subterranean warfare is not new a new military concept, however the creation and usage of an extensive tunnel system by an unconventional force in the modern operating environment is something that has not been seen in recent times. The U.S. Army may enter an operating environment where the

hybrid threat develops an extensive tunnel system that can be used in tactical (smuggling weapons, ambushes) and strategic (attacks on civilian population) operations.

Force Structure. The debate between the IDF conservative and revisionist schools of thought during the interwar period between Operations Cast Lead and Protective Edge serves as a microcosm of the discussions in the U.S. Army today. In the midst of fiscal constraints, the investment of funds to shape U.S. force structure is a significant challenge. Senior leaders face difficult decisions in allocating resources for future capabilities. Revisionists argue that the IDF should invest primarily in air force, intelligence, special operations, stand-off precision fire and cyber capabilities, while the conservative school argues that the lack of investment in conventional ground forces will weaken the military and make it too dependent on technology. Although the IDF is still debating this very issue, the importance of conventional capabilities was evident in Operation Protective Edge. The Merkava tank played a critical role in the execution of operations, and its active armor protection system provided freedom of maneuver for commanders. Seeing the success of the Trophy System during Operation Protective Edge, the IDF is in the process of modernizing all of the Seventh Armored Brigade with the Merkava Mk IV tank. The continuing investment in the Merkava reflects the IDF's commitment to improving conventional capabilities within its force structure.

CAM. It is clear, that even in a hybrid environment with significant underground tunnel networks, the most important objective of a force is to seize and hold terrain. Dr. Rand Fishbein, a leading scholar in International Relations and Middle Eastern Studies, states, "the ability to seize and hold ground will forever remain at the heart of winning strategy . . . the Middle East Theater is no exception."³² He further states that the tank

remains central to war fighting doctrine and is the weapon of choice for commanders wishing to “seize and hold ground in virtually all battlefield conditions.” Whether it is the need to seize key outskirts in urban environments or to maneuver in depth to seize operational objectives, the tank is central in maintaining this capability. The integration and coordination of infantry, armor, engineers, artillery, and other elements of combat power are still relevant and significant in the modern battlefield.

Main Battle Tank. Operation Protective Edge provides several insights into the role of the main battle tank in the modern operating environment. First, an active armor protective system is critical in defending against ATGMs. The Trophy System proved to be successful in countering ATGMS. The M1 Abrams tank currently does not possess an active armor protection system. This must be a primary option in the modernization of the M1 Abrams platform. It is important to recognize the perspective in which the IDF approach the active armor protection system. The IDF does not consider the APS as a defensive system, but an offensive one that allows forces to maneuver faster and deeper without fear of anti-tank threats.³³

Second, the psychological effect of the tank cannot be ignored. Along with its capability to maneuver and employ precision fires, Operation Protective Edge showed that the mere presence of a tank on the battlefield could displace enemy from prepared positions. Augmented with counter-ATGM capabilities (APS systems, camouflage, battle drills), the tank is dominant on the battlefield and provides maneuver options to the commander. The tank provides unique survivability and protection capabilities through its psychological deterrence. In urban environments where perception is critical, the presence of a tank can have tactical and operational influence.

Lastly, in densely populated environment, the survivability of the tank is critical. The Battle of Shuja'iya clearly displayed the vulnerability of armored platforms against a hybrid threat (destruction of APC resulting in seven IDF killed in action). With complex anti-tank ambush sites interwoven with IEDs in urban terrain, the protection that the main battle tank offers is unique and significant. The armament of the main battle tank (augmented with APS) coupled with precision fire capabilities in dense urban terrain is important for success in the future operating environment.

Conclusion

Operation Protective Edge provides a robust case study of warfare between a conventional force and hybrid threat. Although numerous aspects of Operation Protective Edge are unique to the environment and organizations involved, the case study provides insights into the nature of hybrid organizations, application of CAM, and the relevance of the main battle tank. The IDF integrated lessons learned from Operation Cast Lead to execute successful combined arms operations at the tactical and operational levels. The following chapter expounds upon the lessons learned from Operations Cast Lead and Protective Edge, and resolves the problem statement, research questions, and hypotheses.

¹ White, "The Combat Performance of Hamas in the Gaza War of 2014," 1-2.

² Ibid., 1-3.

³ BESA Staff, "Was it a Mistake to Downsize and Deemphasize Israel's Ground Forces?"

⁴ Ibid.

⁵ Ibid.

⁶ Ibid.

⁷ Eitan Shamir and Dr. Eado Hecht, BESA Center Perspectives Paper No. 225, “Neglect of IDF Ground Forces: A Risk to Israel’s Security” (The Begin-Sadat Center for Strategic Studies, Israel, 2014).

⁸ The IDF Armored Corps developed an AAR slide deck to share insights with the U.S. Army. Dr. Richard Williams of DIA passed on slide deck to author for use in thesis. Richard Williams, Analyst Middle East, Defense Intelligence Agency, interview with author, Defense Intelligence Agency Headquarters, Washington, DC, February, 2015; COL Ido Haim, “The Armor Corps on Operation Protective Edge” (PowerPoint Presentation, Army Maneuver Center of Excellence, Ft. Benning, GA).

⁹ Yiftah S. Shapir and Gal Perel, “Subterranean Warfare: A New-Old Challenge,” *INSS*, November 2014, accessed April 28, 2014, http://www.inss.org.il/uploadImages/systemFiles/Subterranean%20Warfare_%20A%20New-Old%20Challenge.pdf, 53.

¹⁰ Haim, slide 15.

¹¹ Israeli Defense Forces, *Special Report: Operation Gaza 2014*, Israeli Defense Forces Blog, January 26, 2015, accessed February 15, 2015, <http://www.idfblog.com/operationgaza2014/>.

¹² Elad Popovich, “A Classical Analysis of the 2014 Israel-Hamas Conflict,” *CTC Sentinel* 7, no. 11 (December 10, 2014): 21.

¹³ Ibid.

¹⁴ Defense Update, “Israeli Active Protection Systems for Armored Vehicles,” *Defense Update: Online Defense Magazine*, June 9, 2010, accessed February 26, 2015, http://defense-update.com/20100609_israeli_aps.html.

¹⁵ ABC News, “Russian Kornet Anti-Tank Missile FAQ.” *ABC News*, May 27, accessed February 26, 2015, <http://abcnews.go.com/International/story?id=79586&page=1>.

¹⁶ Insights in this section informed by discussions with LTC Giber who assisted the author in understanding the strategy and intent behind the modernization of the Merkava tank. LTC Oren Giber, Technological and Logistic Military Attaché, Israeli Embassy, interview with author, Israeli Embassy, Washington, DC, February 17, 2015.

¹⁷ Defense Update, “Israel Active Protection Systems for Armor.”

¹⁸ Defense-Aerospace, “The New M339 Kalanit 120mm Multi-Purpose Tank Round is Empowering the IDF Armored Corps Capabilities in Dealing with the On-Going Terror from the Gaza Strip,” *Defense-Aerospace.com*, January 24, 2011, accessed February 26, 2015, <http://www.defense-aerospace.com/article-view/release/121977/israeli-army-introduces-new-120mm-tank-round.html>; Yaakov Katz, “Mid-air Blast Tank Shell Winner of Defense Prize,” *The Jerusalem Post Online*, July 6, 2011, accessed

March 14, 2015, <http://www.jpost.com/Video-Articles/Video/Mid-air-blast-tank-shell-winner-of-Defense-Prize>.

¹⁹ United Press International, "Israeli Military Orders New Tank Rounds," *United Press International*, August 1, 2011, accessed February 26, 2015, http://www.upi.com/Business_News/Security-Industry/2011/08/01/Israeli-military-orders-new-tank-rounds/55481312215698/.

²⁰ Shapir and Perel, 51.

²¹ Times of Israel Staff, "IDF Releases Details on Shejaiya Battle in which 7 Soldiers Died July 20," *The Times of Israel*, August 22, 2014.

²² Christa Case Bryant, "Why Hamas is a More Formidable Foe in Gaza This Time," *The Christian Science Monitor*, July 25, 2014.

²³ Ibid., 1; Karin Laub and Tia Goldenberg, "Gaza's Deadliest Day: Fierce Ground Battle Over Hamas Stronghold Kills 13 Israeli Soldiers, 65 Palestinians," *National Post*, July 20, 2014.

²⁴ Haim, slide 33.

²⁵ White, "The Combat Performance of Hamas in the Gaza War of 2014," 3.

²⁶ Ibid.

²⁷ Haim, slide 4.

²⁸ White, "The Combat Performance of Hamas in the Gaza War of 2014," 4.

²⁹ Israeli Defense Forces, "The 'Merkava' Celebrates 35 Years of Service in the IDF," Israeli Defense Forces Blog, October 29, 2014, accessed February 15, 2015, <http://www.idfblog.com/blog/2014/10/29/merkava-celebrates-35-years-service-idf/>.

³⁰ Popovich, 23; Interview with Cpt. D., infantry platoon commander, August 27, 2014.

³¹ Defense Update, "Israel's Campaign Directed at Gaza's Tunnel Infrastructure," *Defense Update: Online Defense Magazine*, July 27, 2014, accessed April 28, 2014, http://defense-update.com/20140727_gaza_tunnels.html#.VUAzIkJYgqg.

³² Fishbein, 10.

³³ Haim, slide 19.

CHAPTER 7

INSIGHTS AND RECOMMENDATIONS

It must never be forgotten that the true use of history, military or civil,
is . . . not to make men clever for next time; it is to make them wise forever.
— Sir Michael Howard, “The Use and Abuse of Military History”

With the drawdown of operations in Iraq and Afghanistan, the U.S. Army enters an interwar period facing several challenges. First, the Army is attempting to analyze enemy trends in order to define the future threat, which will drive U.S. Army force structure, concepts, and capabilities. The U.S. Army currently defines the future adversary as a hybrid threat—an irregular organization with a mix of unconventional and conventional capabilities. Second, the U.S. Army is challenged with investing in the proper force structure in the midst of budgetary constraints. Because the future threat is not clearly defined, leaders face difficult decisions when discerning the proper mix of platforms and capabilities in which to invest. The force structure debate revolves around two schools of thought: the revisionist school of thought, which prioritizes force structure investments in intelligence, air, special operations, ISR, and cyber capabilities, and the conservative school of thought which prioritizes investments in conventional capabilities including the modernization of the M1 Abrams tank. The debate surrounding U.S. Army force structure shapes the third challenge: determining the relevancy of CAM. If the force structure adopts the tenets espoused by the revisionist school of thought, then CAM is no longer relevant and must be replaced by a new concept that optimizes ISR, intelligence, stand-off fire and special operations platforms and capabilities. If CAM is still relevant and effective in the hybrid environment, then force structure should follow the

conservative school of thought and continue to include an armored capability. An understanding of the debate regarding the hybrid threat, force structure and CAM, provide the analytical context in which to discuss the role of the M1 Abrams tank in the U.S. Army of 2015-2025.

In order to predict the role of the M1 Abrams tank in the U.S. Army of 2015-2025, the thesis presented the IDF Merkava tank as a comparable platform and examines the experience of the IDF from the Second Lebanon War to Operation Protective Edge to derive lessons learned through iterations of combat between a conventional force and a hybrid threat. Based on the analysis in the previous chapters, this thesis concludes with the following insights.

Hybrid Threat

Hybrid capabilities exhibited by Hamas did not negate the effectiveness of the Merkava on the battlefield. However, their offensive and defensive tactics introduced several trends that the U.S. Army may see in future adversaries.

Trend #1: The future threat will most likely possess extensive anti-tank capabilities. The proliferation of anti-tank weapons greatly increased between Operations Cast Lead and Protective Edge. The proliferation of ATGMs (and systems such as tandem warhead RPGs) will continue and likely will be effectively utilized by future adversaries. The successful use of these weapon systems during the 2006 Lebanon War and Operation Cast Lead, and the extensive use by Hamas during Operation Protective Edge, confirms the effectiveness of ATGMs against conventional forces. Given their effectiveness, these weapons are highly likely to be procured by future adversaries. U.S. Army experience during OIF and OEF resulted in counter-IED strategy and doctrine. In

the same way, it is critical for the U.S. Army to preempt the ATGM problem and develop holistic strategies to counter this capability. It is prudent for the U.S. Army to heed the following assessment of U.S. maneuver doctrine and capability by an Israeli officer: The U.S. Army's "notions concerning intelligence dominance replacing armor are disproved by our lessons . . . [More] balanced training is not enough. Strykers and MRAPs will not [withstand] a medium-heavy ATGM."¹ The M1 Abrams tank provides unique protection capabilities required to defeat a hybrid threat armed with ATGMs.

Trend #2: Future adversaries may utilize subterranean warfare to counteract the strengths of conventional forces. This thesis acknowledges that subterranean warfare is not new. Throughout history, weaker and smaller forces have utilized tunnels to counter air, firepower, and ISR advantages of stronger forces. Although not extensively utilized by Hamas during Operation Cast Lead, tunnel operations were significant during Operation Protective Edge. The IDF destroyed thirty-four cross-border tunnels during the operation, many of which were complex systems with branch and parallel routes. The United States must anticipate the possibility of fighting in an operating environment with extensive tunnel networks integrated into densely populated terrain. In these types of environments, the United States must expect air power and ISR advantages to be reduced, and be prepared to seize and hold terrain.

Force Structure

The force structure required to defeat Hamas during Operations Cast Lead and Protective Edge included a preponderance of conventional capabilities. This is essentially a debate between the revisionist and conservative schools of thought regarding the optimal construct of force structure and the investments to be made in the midst of

budgetary constraints. Both schools of thought present credible and substantial arguments. Revisionists argue that future high intensity conflicts are unlikely and that future U.S. conflicts will be limited and unconventional in nature. As a result, investment should be made in air, ISR, special operations, cyber, and other emerging technology capabilities. The conservative school of thought argues that the preponderance of force structure should reside in conventional capabilities. They argue that war has not fundamentally changed and remains a clash of wills requiring the seizing and retention of objectives, and the massing of firepower by land platforms and units.

Insight #1: Operations Cast Lead and Protective Edge demonstrated the utility of conventional capabilities against a hybrid threat. The IDF deployed combined arms task forces comprised of armor, infantry, artillery, and engineer platforms. However, the operations also showed the importance of extensive ISR (particularly important for targeting in densely populated terrain), special forces and air power. The IDF experience demonstrates that the conservative and revisionist schools of thought are not mutually exclusive. The challenge for the U.S. Army is to find the balance between the two schools of thought when developing the future force. The IDF experience shows that the emerging technologies espoused by the revisionist school need not be substitutive, but could provide additive capability. However, one clear lesson from the operations is that a force structure based on conventional capabilities provides the best foundation for an adaptable force that can meet multiple types of threats. The IDF experience during the Second Lebanon War, Operation Cast Lead, and Operation Protective Edge show that a force trained and equipped for low-intensity conflicts, even with significant air, ISR, and special operations capabilities, may not be capable of defeating or neutralizing hybrid

threats. The U.S. Army should seek to augment rather than replace its conventional force structure with the capabilities espoused by the revisionist school of thought.

Insight #2: The U.S. Army must continually debate the character of future conflicts without basing analysis solely on experiences in Iraq and Afghanistan over the past thirteen years. It is prudent for the U.S. Army to continually debate the character of future conflicts and determine the force structure most capable of meeting its demands. The decisions made today will directly impact the outcome of future operations; this is especially true in an environment of significant fiscal constraints. Given the nature of the military profession and the resources provided by our nation to execute combat, the Army has a great responsibility to properly allocate resources, direct training, and develop force structure. The U.S. Army must be diligent in extracting enemy trends and identifying the trajectory of hybrid capabilities seen in conflicts throughout the world, rather than relying solely on its combat experience in Iraq and Afghanistan. The Army must not revert to the Combat Training Center-based model that predated the experiences after 9/11. While the past thirteen years of combat have developed a generation of combat-tested soldiers, there is an inherent danger in relying solely on this experience. The future threat may resemble elements of the insurgency faced in Iraq and Afghanistan, but it is important not to become complacent in analyzing potential adversaries. For the IDF, prior to the 2006 Lebanon campaign, the focus on low-intensity operations “created a misconception of what war is really like” among officers.² This is not to say that the U.S. Army does not understand warfare, but rather offers a warning for leaders to question assumptions and biases, and, as much as possible, avoid the human tendency to apply templates from

previous experiences without thinking critically about the potential advantages of new strategies.

Combined Arms Maneuver

Operations Cast Lead and Protective Edge show that CAM is relevant, and can be critical, in the hybrid environment. The emergence of hybrid threats has not negated the need for conventional forces to maneuver aggressively against an enemy, seize and hold terrain, and apply precision fires. Although unmanned aerial systems and other technologies can add to the combat power of CAM, their capabilities cannot replace those provided by conventional CAM platforms.

Insight #1: Even against a hybrid threat that utilizes extensive underground tunnels, the ability to seize and hold terrain remains a key aspect of ground warfare. Operations Cast Lead and Protective Edge both clearly displayed the need for conventional forces to seize infrastructure and hold terrain (urban “outskirts”) in order to defeat a hybrid threat. U.S. Army doctrine directly reflects the importance of this concept in its definition of CAM—the need to apply the elements of combat power to seize, occupy, and defend land areas.³ In 2009, Major General Isaac Ben Israel stated that from the Second Lebanon War the IDF learned that if you want to stop insurgent rocket launchers “you need to send soldiers in and take the area and control it.”⁴ Dr. Fishbein, a noted Middle Eastern scholar, states that the ability to seize and hold terrain will forever be a part of a combat winning strategy, including the Middle East. The U.S. Army must retain the ability to maneuver in depth and mass firepower in order to seize objectives. Given the enemy’s integration of stand-off fire capabilities (particularly ATGMs), employment of extensive prepared defensive positions, and utilization of urban terrain, a

mobile precision fire platform is critical for the successful execution of CAM. The ability to mass discerning fires at extended ranges, maneuver to displace the enemy, and provide protection is critical to seizing and holding terrain. Unless there is a fundamental change in the character of warfare, a mobile, protected, precision fire platform is needed to accomplish CAM.

Insight #2: Combined arms maneuver is essential in displacing the enemy from prepared defensive positions. As the enemy continues to adapt, it will seek to undermine technological advantages held by opposing forces. Hezbollah utilized extensive prepared defensive position in depth during the Second Lebanon War, while Hamas integrated anti-tank capabilities and adopted subterranean networks to negate IDF firepower advantages. Dr. Johnson states that it takes armored platforms, such as the tank, to maneuver and force the enemy to expose itself.⁵ The IDF experience displays the importance of CAM to displace threats from prepared defensive positions. Aggressive maneuvering exposes the enemy, allowing for the massing of fires from the elements of combat power. Both the psychological effect of the tank and the ability to maneuver, close-with, and mass fires on the enemy contribute to the ability of a CAM force to take the initiative.

Operations Cast Lead and Protective Edge clearly displayed that air power, ISR, and stand-off fire capabilities alone cannot displace the enemy. This is a clear warning for the U.S. Army not to develop an over-reliance on these capabilities. Effective combined arms operations can counter an enemy's use of anti-tank capabilities integrated into terrain consisting of underground tunnels, prepared defensive positions, and urban infrastructure. In the hybrid environment, CAM is necessary to displace and destroy an

enemy that continues to adapt and integrate capabilities to negate the opposing force's technological advantages.

Main Battle Tank

Operations Cast Lead and Protective Edge displayed the central role of the Merkava in displacing the enemy from prepared defensive positions, reducing risk, and providing maneuver options for the battlefield commander in both urban and conventional environments. This thesis argues that the M1 Abrams tank is the only platform that can provide sufficient protection against a hybrid threat with ATGMs for the U.S. Army of 2015-2025.

Insight #1: The main battle tank provides precision fire capabilities that are critical in urban environments. Operations Cast Lead and Protective Edge displayed the Merkava's capability to employ precision fires to destroy enemy targets and support infantry troops in densely populated terrain. This capability proved to be critical in an environment in which political and military objectives required discretionary rules of engagement. To support this requirement, the IDF integrated new tank munitions with increased effectiveness in urban environments. IDF tank crews possessed the tools necessary to destroy enemy targets while minimizing collateral damage. It is prudent for the U.S. Army to consider an update in munitions with similar capabilities as the Kalanit and Hatza tank rounds. As the United States prepares to conduct operations in a hybrid environment, it must ensure that its forces have the proper tools to successfully accomplish its missions.

Insight #2: As part of a strategy to counter ATGMs, the U.S. Army must consider adopting an active armor protective system. The IDF Trophy System proved to be critical

in defending against the ATGM threat during Operations Cast Lead and Protective Edge. During the latter, the Merkava's Trophy System successfully repelled four anti-tank missiles. It must be noted that Russia's newly developed main battle tank, the T-14 Armata, possesses a similar active armor protection system (see figure 25).⁶

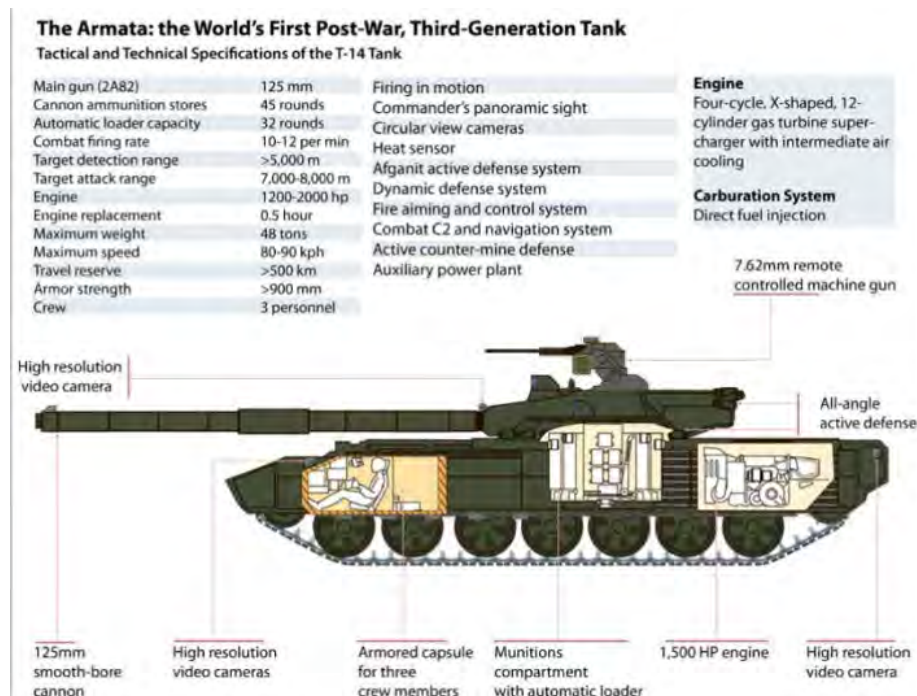


Figure 25. Russian T-14 Specifications

Source: Sergei Kaprovat, "Russia Considers Standardized Chassis for Most Tracked Vehicles," *Foreign Military Studies Office OE Watch: Foreign News and Perspectives of the Operational Environment* 5, no. 3 (March 2015): 51-52, accessed March 16, 2015, <http://www.rg.ru/2015/02/02/tank.html>.

The active defense system is an individual anti-missile and anti-projectile tank defense system that defends the vehicle from ground and air projectiles. It is situated along the perimeter of the turret at various levels, ensuring protection of the tank's most

important components.⁷ The U.S. Army is behind in the development of an active armor protection system that can counter the ATGM threat. The Army must consider adopting this system for not only its main battle tank but also on armored infantry, Stryker, and Mine Resistant Ambush Protected platforms. This technology should only be a part of an overall strategy to counter ATGM threats; development of tactics through combined capabilities (such as the support companies implemented by the IDF) and camouflage should all be incorporated to the overall strategy.

Insight #3: The U.S. Army must adjust and adapt tank gunnery and maneuver training in order to prepare for operations in a hybrid environment; the regional alignment construct provides an opportunity for leaders to focus training based on threat assessments. With the end of the 2006 campaign, IDF leaders reassessed their training strategy to prepare their units for future conflicts. The IDF predicted that the future threat would maintain low signatures by assimilating in populations and preparing hidden fortified positions; conduct defense in depth with ATGMs and rockets; and continue to use guerilla and irregular tactics, including expanding into underground warfare. With a reprioritization and focus on conventional capabilities, the IDF armored corps implemented conceptual changes in gunnery training, focusing on targets “without dimension” (see figure 26).⁸ Armor corps leaders recognized that most targets encountered in a hybrid environment had minimal exposure—creating detection, identification, and targeting complexities.

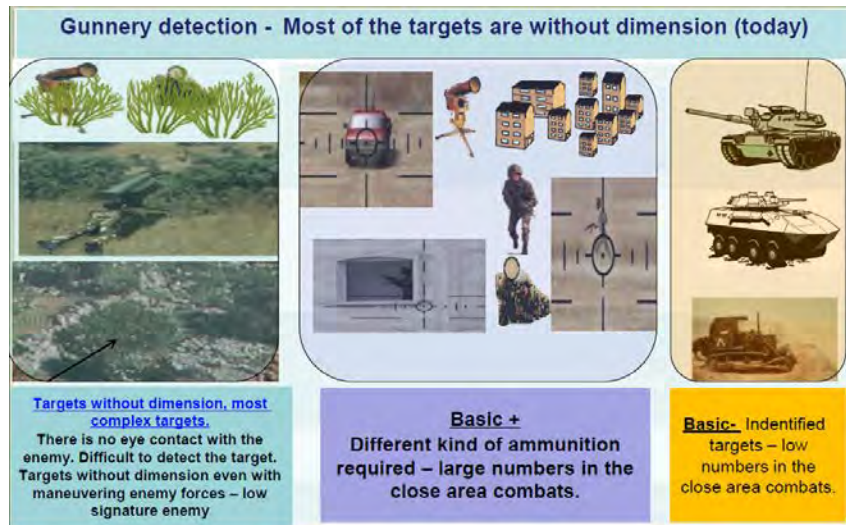


Figure 26. IDF Tank Gunnery—Concept Change

Source: COL Ido Haim, “The Armor Corps on Operation Protective Edge” (PowerPoint Presentation, Army Maneuver Center of Excellence, Ft. Benning, GA), slide 23.

Rather than firing rounds from battle positions at targets two to four kilometers away (as during HIC engagements), gunnery training may require crews to shoot at targets in urban infrastructure one to two kilometers away but that have reduced signatures. The U.S. Army must adjust its training to reflect hybrid threat trends and prepare units for future conflicts.

As the U.S. Army has transitioned to capabilities-based concepts (shifting away from a threat-based focus), the need for training prioritization has greatly increased. Units are required to be proficient in all elements of Decisive Action: offense, defense, stability, and defense support of civil authorities operations. However, this requirement, to possess capabilities across the range of military operations in both low and high intensity environments, challenges leaders to develop proficiency within the constraints of time, budget, and space. The U.S. Army has asked its soldiers to be adaptable and

flexible. However, it is important to realize that there is an inherent danger in relying solely on adaptability and flexibility. The IDF experienced this danger, which resulted in dire consequences during the 2006 Lebanon campaign:

There is danger with relying on adaptability and flexibility. Against American professionalism, Israel has developed the ethic of improvisation. Against the Americans' stringent obeying of rules, Israel has become a slave to creativity. Rather than be "uncool" [an Israeli] will adjust to circumstances. However, over the years, these traits that Israel has attached itself have undergone a pathological change: operational flexibility has turned into negligence and freedom of action in fulfilling assignments has become irresponsible abandon.⁹

This thesis argues that capabilities-based and threat-based assessments are not mutually exclusive, and that both should be incorporated into a unit's training plan. Tank gunnery should reflect the character of conflict most likely to be seen by that unit. For that reason, gunnery training in the Pacific should differ from gunnery training focused in the Middle East, Europe, or Africa. Although the fundamentals are the same, training objectives should differ (based on projected targets and terrain). The regional alignment construct provides a unique opportunity to re-tailor training based on threat-based assessments. Finding the proper balance between capabilities and threat-based assessments, integrated with the regional alignment construct, will assist units in prioritizing and shaping gunnery and maneuver training.

Conclusion

Based on the preceding analysis, this thesis proposes that the role of the M1 Abrams tank in the U.S. Army of 2015-2025 is to provide a mobile and survivable, precision firepower platform to execute effective combined arms operations against a sophisticated hybrid threat with ATGM capabilities in order to seize and hold terrain, mass discretionary fires in urban and conventional environments, and destroy the enemy

threat. The IDF experience in the Second Lebanon War and Operations Cast Lead and Protective Edge demonstrate that the capabilities of the main battle tank are likely to be more critical and relevant in a hybrid environment than was seen in the past thirteen years of combat in Iraq and Afghanistan.

The proliferation of ATGMs, utilization of conventional capabilities by unconventional organizations, and integration of extensive defensive positions in urban terrain (in-depth, as seen in Lebanon, or underground, as seen in Gaza), point to a future threat that is adaptive, complex, and capable. Based on this assessment, the U.S. Army should maintain a baseline conventional force structure proficient in combined arms warfare and augmented with emerging technologies. The conventional and revisionist schools of thought are not mutually exclusive. However, the challenge remains to find the proper balance between conventional platforms and emerging technologies. This analysis suggests conventional combined arms capabilities should remain the foundation of the U.S. Army, with air, ISR, special operations, and other emerging technologies providing additive elements to an overall combined arms concept.

In order to prepare for future conflicts, the U.S. Army must consider modernizing its tank and armored platforms, including Bradley and Stryker vehicles, with an active armor protection system and improved munitions. Enemy capabilities have surpassed the protection offered by current armament. The effectiveness of ATGMs and tandem warhead RPGs requires adaptation in materiel, doctrine, and training by the U.S. Army (much like the approach to IEDs). Furthermore, tank units must adapt maneuver and gunnery training to meet the challenges of the hybrid environment. The regional

alignment initiative provides an opportunity to re-tailor training based on threat-based assessments

No two conflicts are identical. The complexities and nuances resulting from culture, geography, infrastructure, decision-making, and chance, ensure that history will never repeat itself in an exact manner. However, it would be imprudent to ignore past military operations, as “war is nonetheless a distinct and repetitive form of human behavior.”¹⁰ It is wise to heed Sir Michael Howard’s instruction to be conscious of the “uniqueness of every historical event” while pursuing the study of past military operations in “width, depth, and context” to understand the character of war and to directly improve the officer’s competence in his profession.¹¹ An analysis of Operations Cast Lead and Protective Edge displays the complexities that could be faced by U.S. political and military leaders. In an environment of fiscal constraints, the decisions made today will have an even more important impact on the outcome of future operations. Given the nature of the military profession and the resources provided by our nation to execute combat, the responsibility to properly allocate resources, direct training, and develop force structure is great. It is with fervent discipline, focus, creativity, and vigor that Army professionals must consider the future of the U.S. Army.

¹ Farquhar, 98. Chapter 1 in this monograph is written by Dr. Matt Matthews.

² Harel and Issacharoff, 45.

³ Headquarters, Department of the Army, ADP 3-0, 6.

⁴ Charles Levinson, “Israel’s Ground Assault Marks Shift in Strategy,” *Wall Street Journal Online*, January 5, 2009, accessed March 7, 2015, <http://www.wsj.com/articles/SB123106067991451749>.

⁵ Johnson, “Hard Fighting,” 134.

⁶ Sergei Kaprovat, “Russia Considers Standardized Chassis for Most Tracked Vehicles,” *Foreign Military Studies Office OE Watch: Foreign News and Perspectives of the Operational Environment* 5, no. 3 (March 2015): 52-53.

⁷ Ibid.

⁸ Haim, slide 23.

⁹ Harel and Issacharoff, 257.

¹⁰ Sir Michael Howard, “The Use and Abuse of Military History,” *Royal United Service Institute Journal* 107, no. 625 (February 1962): 6.

¹¹ Ibid.

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